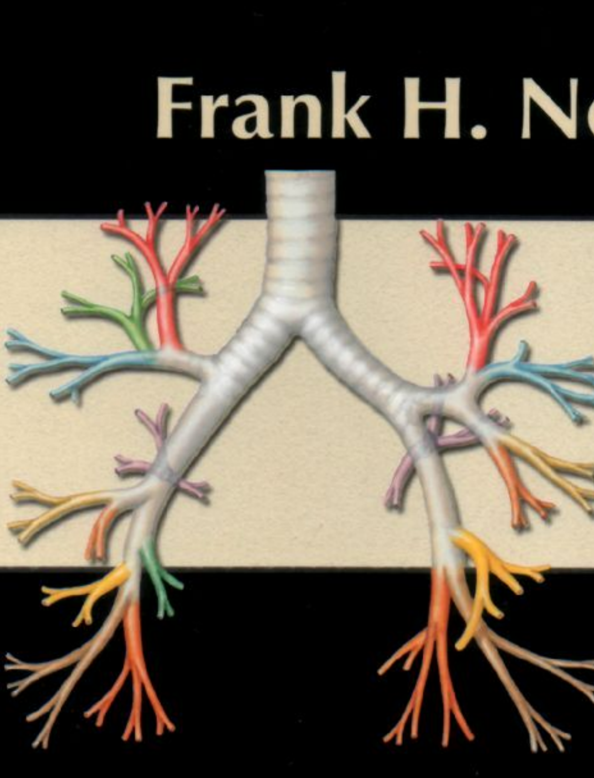
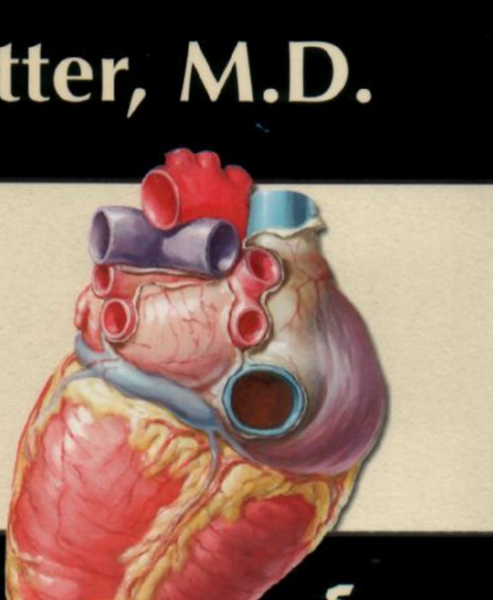
Atlas of Human Anatomy

Third Edition

Frank H. Netter, M.D.





F. Netter M.D.

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Atlas
Human

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Third Edition

by Frank H. Netter, M.D.

John T. Hansen, Ph.D., *Consulting Editor*
University of Rochester School of Medicine and Dentistry
Rochester, New York

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To my dear wife, Vera

PREFACE TO THE FIRST EDITION

I have often said that my career as a medical artist for almost 50 years has been a sort of "command performance" in the sense that it has grown in response to the desires and requests of the medical profession. Over these many years, I have produced almost 4,000 illustrations, mostly for *The CIBA* (now *Netter*) *Collection of Medical Illustrations* but also for *Clinical Symposia*. These pictures have been concerned with the varied subdivisions of medical knowledge such as gross anatomy, histology, embryology, physiology, pathology, diagnostic modalities, surgical and therapeutic techniques and clinical manifestations of a multitude of diseases. As the years went by, however, there were more and more requests from physicians and students for me to produce an atlas purely of gross anatomy. Thus, this atlas has come about, not through any inspiration on my part but rather, like most of my previous works, as a fulfillment of the desires of the medical profession.

It involved going back over all the illustrations I had made over so many years, selecting those pertinent to gross anatomy, classifying them and organizing them by system and region, adapting them to page size and space and arranging them in logical sequence. Anatomy of course does not change, but our understanding of anatomy and its clinical significance does change, as do anatomical terminology and nomenclature. This therefore required much updating of many of the older pictures and even revision of a number of them in order to make them more pertinent to today's ever-expanding scope of medical and surgical practice. In addition, I found that there were gaps in the portrayal of medical knowledge as pictorialized in the illustrations I had previously done, and this necessitated my making a number of new pictures that are included in this volume.

In creating an atlas such as this, it is important to achieve a happy medium between complexity and simplification. If the pictures are too complex, they may be difficult and confusing to read; if oversimplified, they may not be adequately definitive or may even be misleading. I have therefore striven for a middle course of realism without the clutter of confusing minutiae. I hope that the students and members of the medical and allied professions will find the illustrations readily understandable, yet instructive and useful.

At one point, the publisher and I thought it might be nice to include a foreword by a truly outstanding and renowned anatomist, but there are so many in that category that we could not make a choice. We did think of men like Vesalius, Leonardo da Vinci, William Hunter and Henry Gray, who of course are unfortunately unavailable, but I do wonder what their comments might have been about this atlas.

Frank H. Netter, M.D.
(1906–1991)

PHOTOGRAPH BY JAMES L. CLAYTON

FRANK H. NETTER, M.D.

FOREWORD

"The release in 1989 of the first edition of Dr. Frank Netter's 'personal Sistine Chapel'—the Atlas of Human Anatomy—was a major event in the history of the teaching and learning of anatomy. Almost instantly, the Atlas of Human Anatomy became the top-selling anatomical atlas in the world and clearly became the students' choice universally." This quotation from the second edition of the *Atlas of Human Anatomy* still resonates today as the beautifully conceived and rendered artwork of Dr. Netter continues to capture the admiration of students and healthcare professionals.

The skillful editing and publishing teamwork of Novartis Medical Education, in consultation with many of the 20th century's outstanding anatomists and physicians, have made the first and second editions of the *Atlas* the standard against which all other atlases are compared. This third edition owes much to the Consulting Editors of the earlier editions, Drs. Sharon Colacino (Oberg) (first edition) and Arthur F. Dalley II (second edition), who shepherded their editions with great skill and uncompromising professionalism and thus made my task significantly easier. I am honored to serve as the Consulting Editor of the third edition and to continue the Netter tradition in partnership with Icon Learning Systems as the *Atlas of Human Anatomy* enters the new century.

Perceptive student and faculty response to the earlier editions prompted greater attention to several concepts that are critical to the anatomical basis of clinical practice. Notably, each regional section now begins with a surface anatomy plate, skillfully drawn by Carlos A.G. Machado, M.D. These surface anatomy plates remind us of the value of careful observation in clinical medicine and draw attention to surface features that portend the underlying anatomy.

We also have included a significant number of normal radiographic images in this edition, reflecting the importance of diagnostic imaging in clinical anatomy and medicine. These new images are not meant to be comprehensive of the radiographic knowledge available to today's clinicians, but rather are starting points for further exploration into the richness of anatomical detail that imaging can provide. I am grateful to Matthew Cham, M.D., and John Wandtke, M.D., of our Department of Radiology for selecting these images and permitting us to use them in this edition.

We balanced the addition of new surface and radiographic anatomy plates largely by eliminating several plates that contributed little to the quality of the *Atlas*. Several plates from *The Netter* (formerly *CIBA*) *Collection of Medical Illustrations* were added and several plates were altered slightly to correct anatomical errors consistent with our current knowledge. In sum, the third edition has grown by 30 images. Finally, the References and the Index have been updated.

The anatomical terminology is consistent throughout the *Atlas* and conforms to the International Anatomical Terminology (*Terminologia Anatomica*) approved in 1998 by the International Federation of Associations of Anatomists. Common eponyms are retained parenthetically, and the leader lines and labels have been checked and, where necessary, corrected to ensure their accuracy. For reviewing this material I thank Wojciech Pawlina, M.D., Leonard J. Cleary, Ph.D., Daniel O. Graney, Ph.D., and Brian R. MacPherson, Ph.D. Their meticulous examination of each plate has greatly enhanced the accuracy of this atlas.

For the proofreading, editing and designing, I am indebted to Jennifer Surich, Erika Gehringer and Greg Otis at Icon Learning Systems; their keen eyesight, dedication and professionalism buoyed me when I began to drift. A special thank you is reserved for Paul Kelly, Executive Editor, who continues to listen patiently and is a true believer in the power of the visual image to teach.

To all students, past, present and future, the legacy of Dr. Netter's artwork lives in you; his unique ability to "clarify rather than intimidate" is his gift to you. I am both privileged and humbled to have the opportunity to carry forward this tradition of excellence and to contribute to your understanding of human anatomy.

Finally, to my wife, Paula, thank you for giving me the freedom to write and the support to sustain me—in those respects, this book was co-edited.

John T. Hansen, Ph.D.
Professor of Neurobiology and Anatomy
University of Rochester School of Medicine and Dentistry
Rochester, New York

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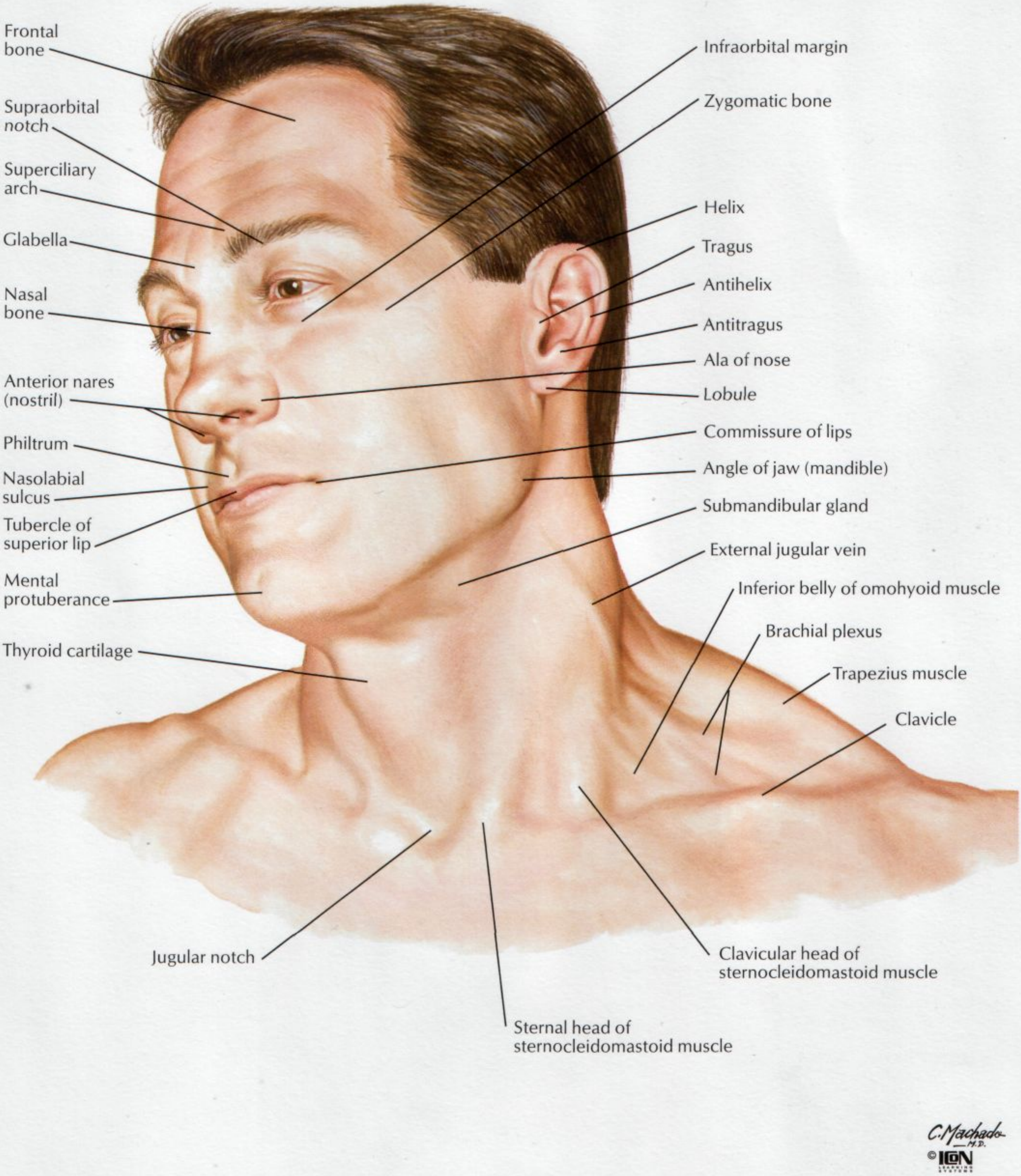
Frontal bone
Supraorbital notch
Superciliary arch
Glabella
Nasal bone
Anterior nares (nostril)
Philtrum
Nasolabial sulcus
Tubercle of superior lip
Mental protuberance
Thyroid cartilage
Infraorbital margin
Zygomatic bone
Helix
Tragus
Antihelix
Antitragus
Ala of nose
Lobule
Commissure of lips
Angle of jaw (mandible)
Submandibular gland
External jugular vein
Inferior belly of omohyoid muscle
Brachial plexus
Trapezius muscle
Clavicle
Jugular notch
Clavicular head of sternocleidomastoid muscle
Sternal head of sternocleidomastoid muscle
C. Machado M.D.
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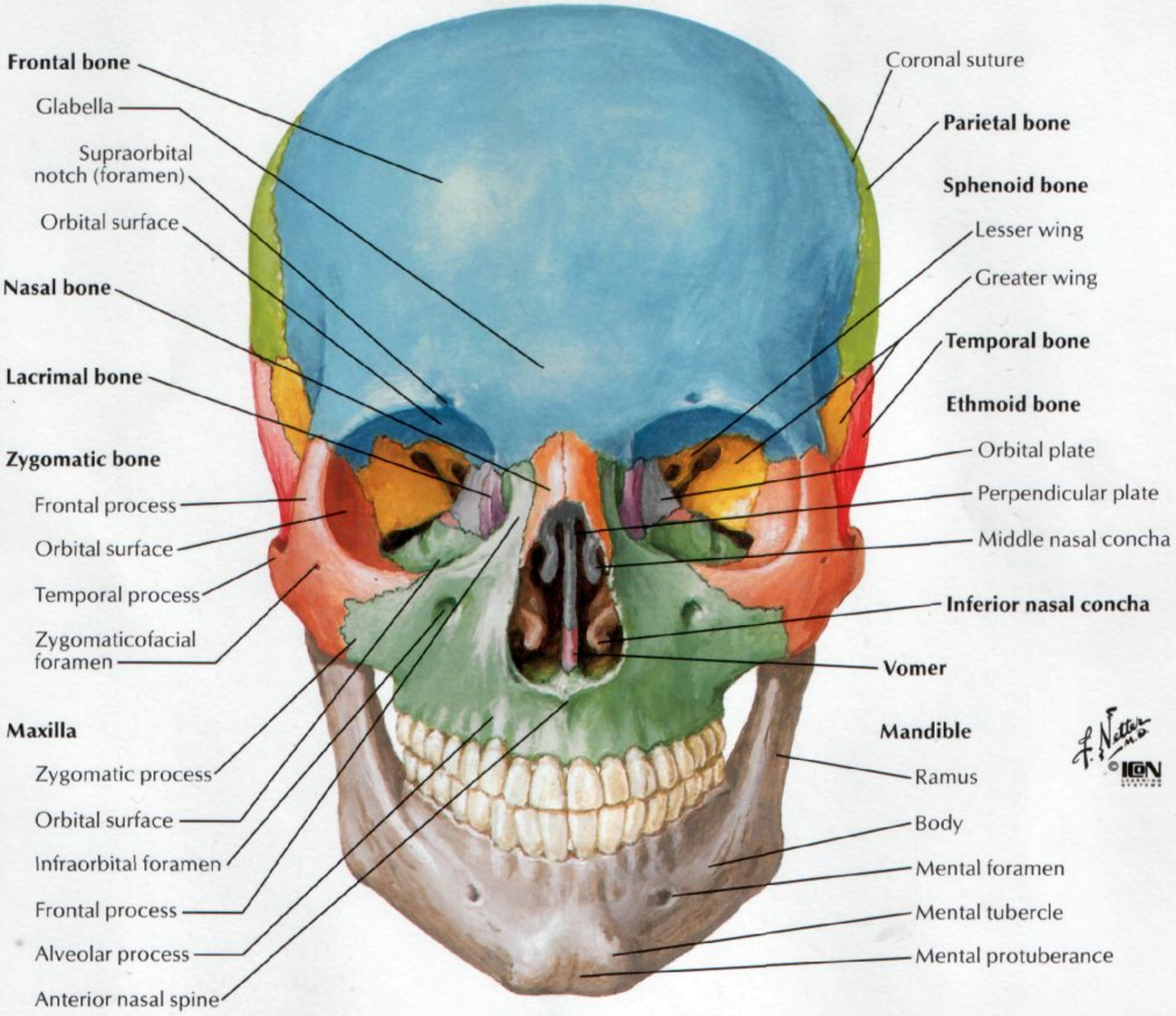
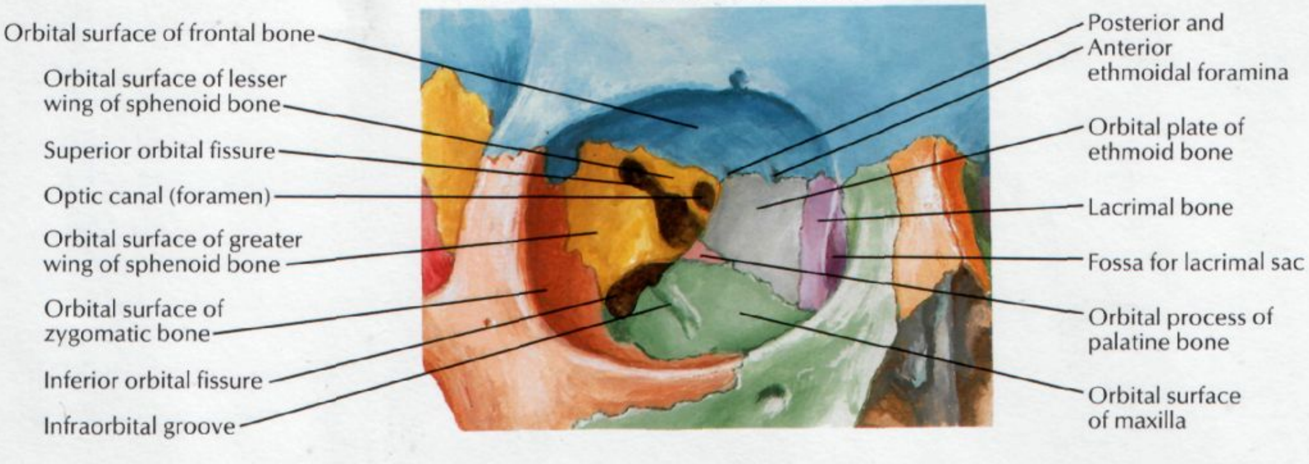
Skull: Anterior View

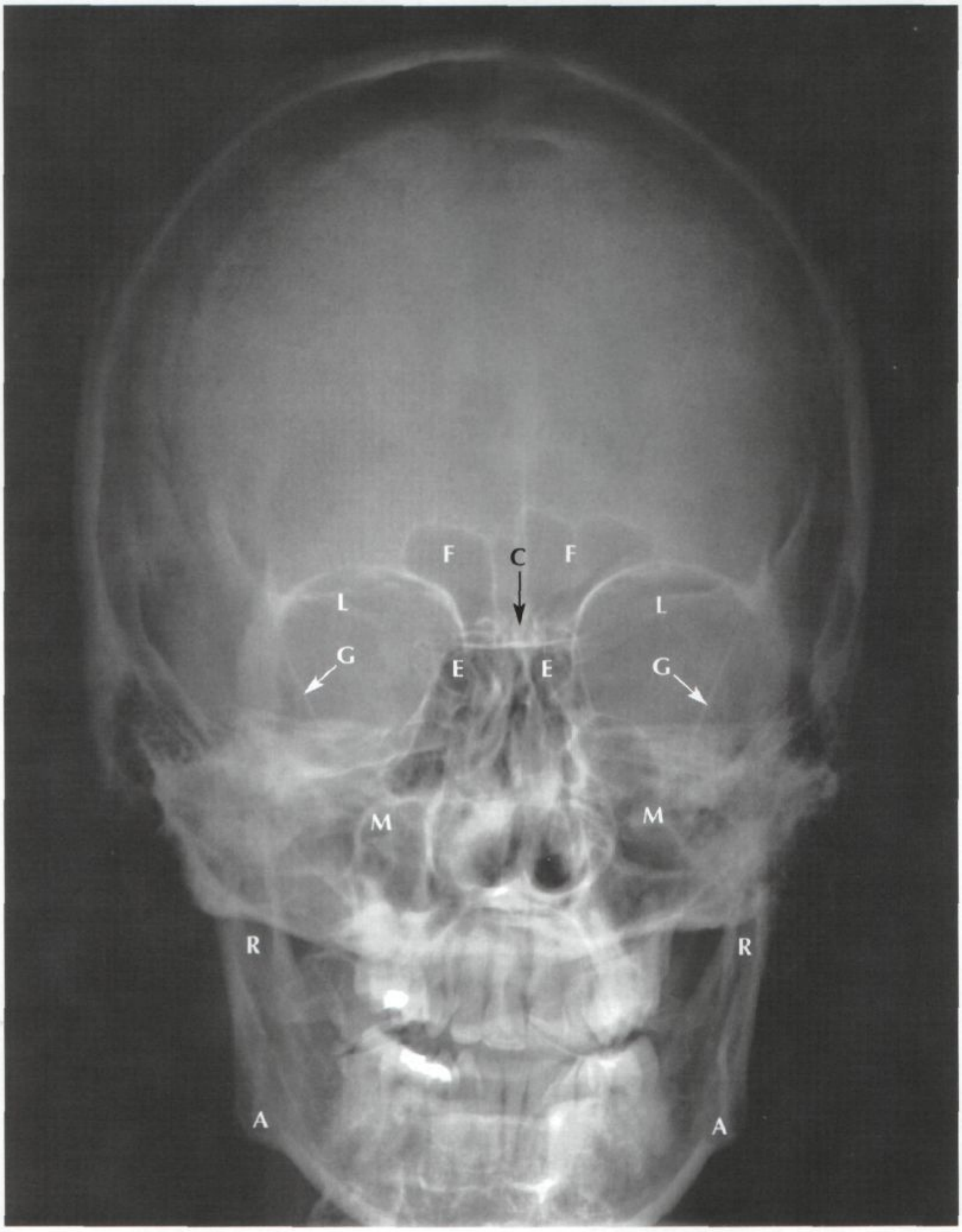


Right orbit: frontal and slightly lateral view


Orbital surface of frontal bone
Orbital surface of lesser wing of sphenoid bone
Superior orbital fissure
Optic canal (foramen)
Orbital surface of greater wing of sphenoid bone
Orbital surface of zygomatic bone
Inferior orbital fissure
Infraorbital groove
Posterior and Anterior ethmoidal foramina
Orbital plate of ethmoid bone
Lacrimal bone
Fossa for lacrimal sac
Orbital process of palatine bone
Orbital surface of maxilla

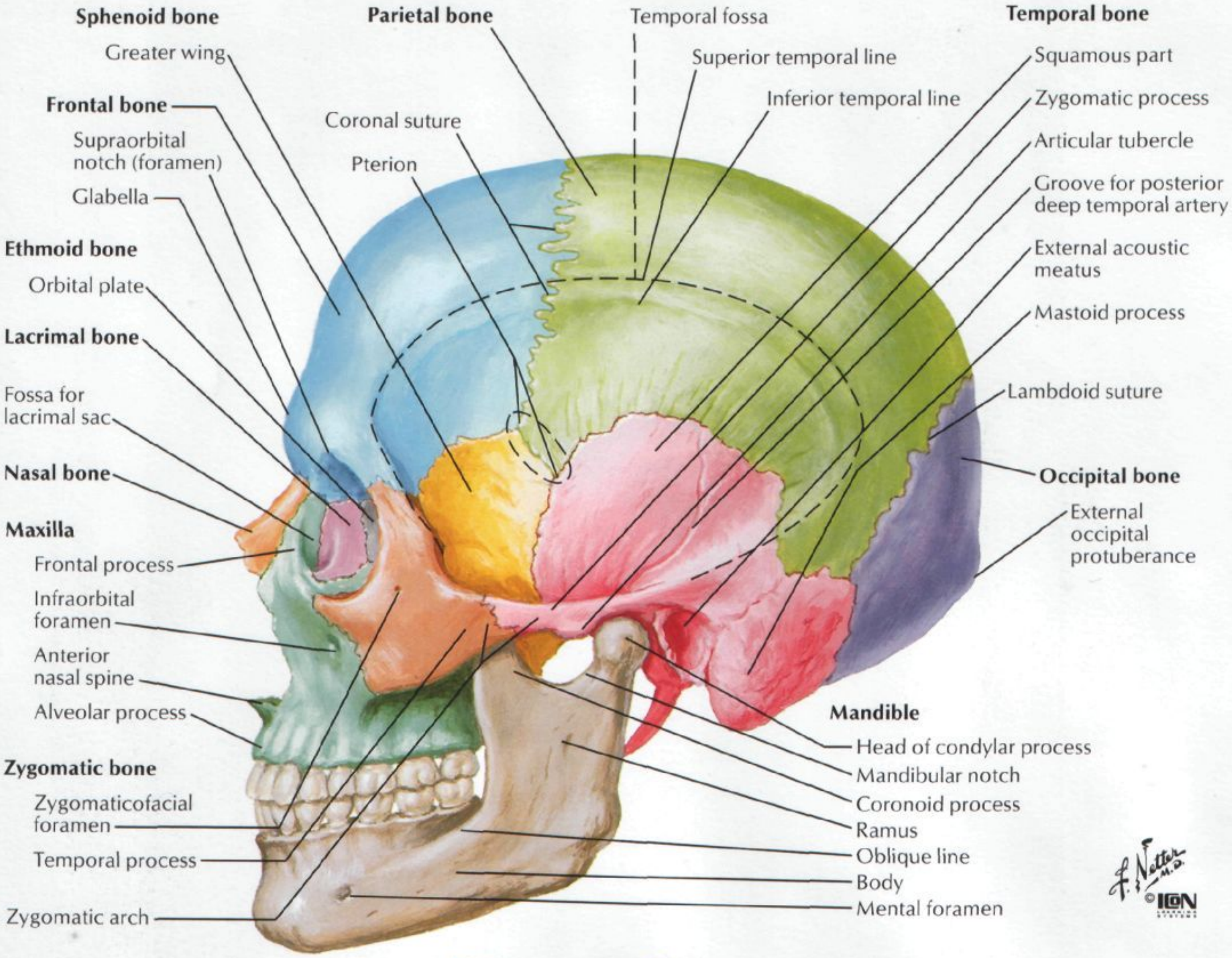
Skull: Anteroposterior Radiograph

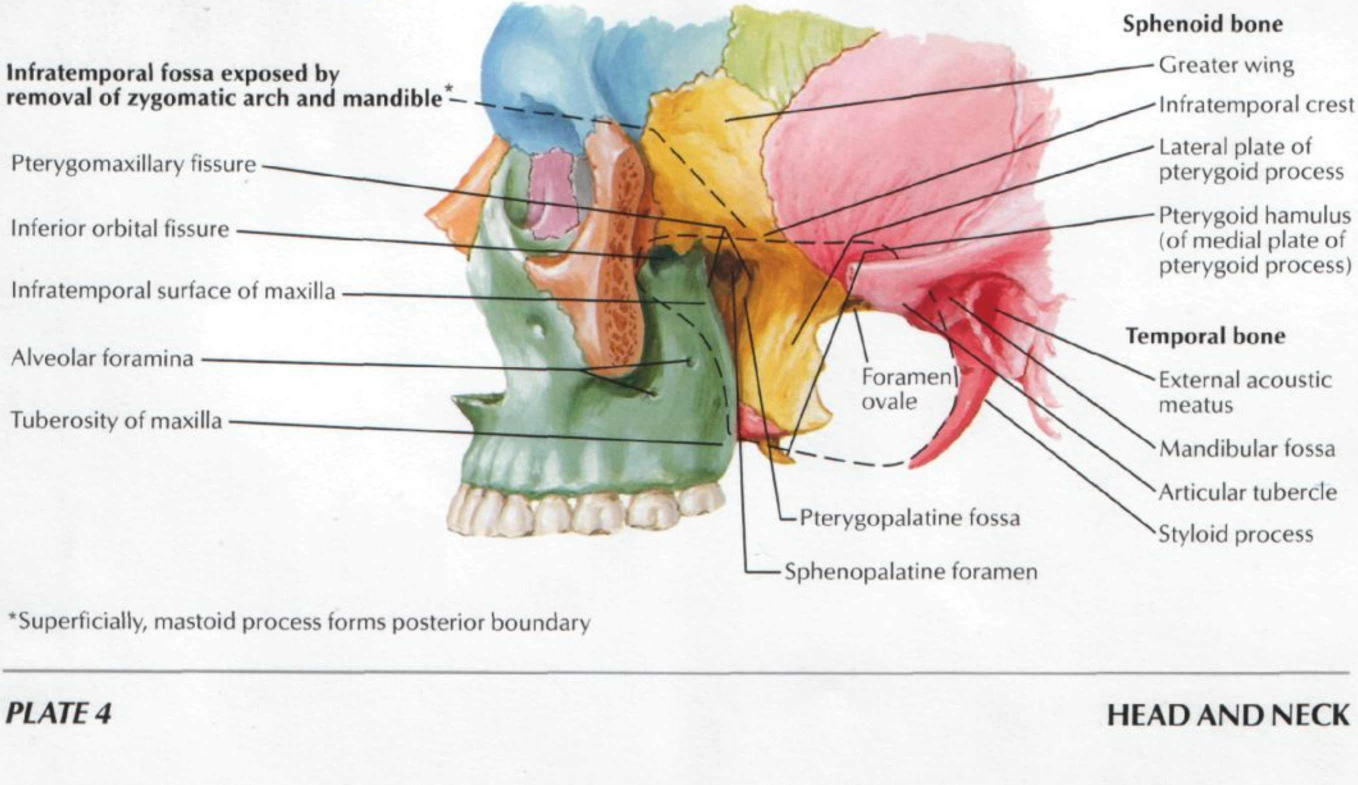
SEE ALSO PLATE 2



A Angle of mandible
C Crista galli
E Ethmoid sinus
F Frontal sinus
G Greater wing of sphenoid
L Lesser wing of sphenoid
M Maxillary sinus
R Ramus of mandible

Skull: Lateral View

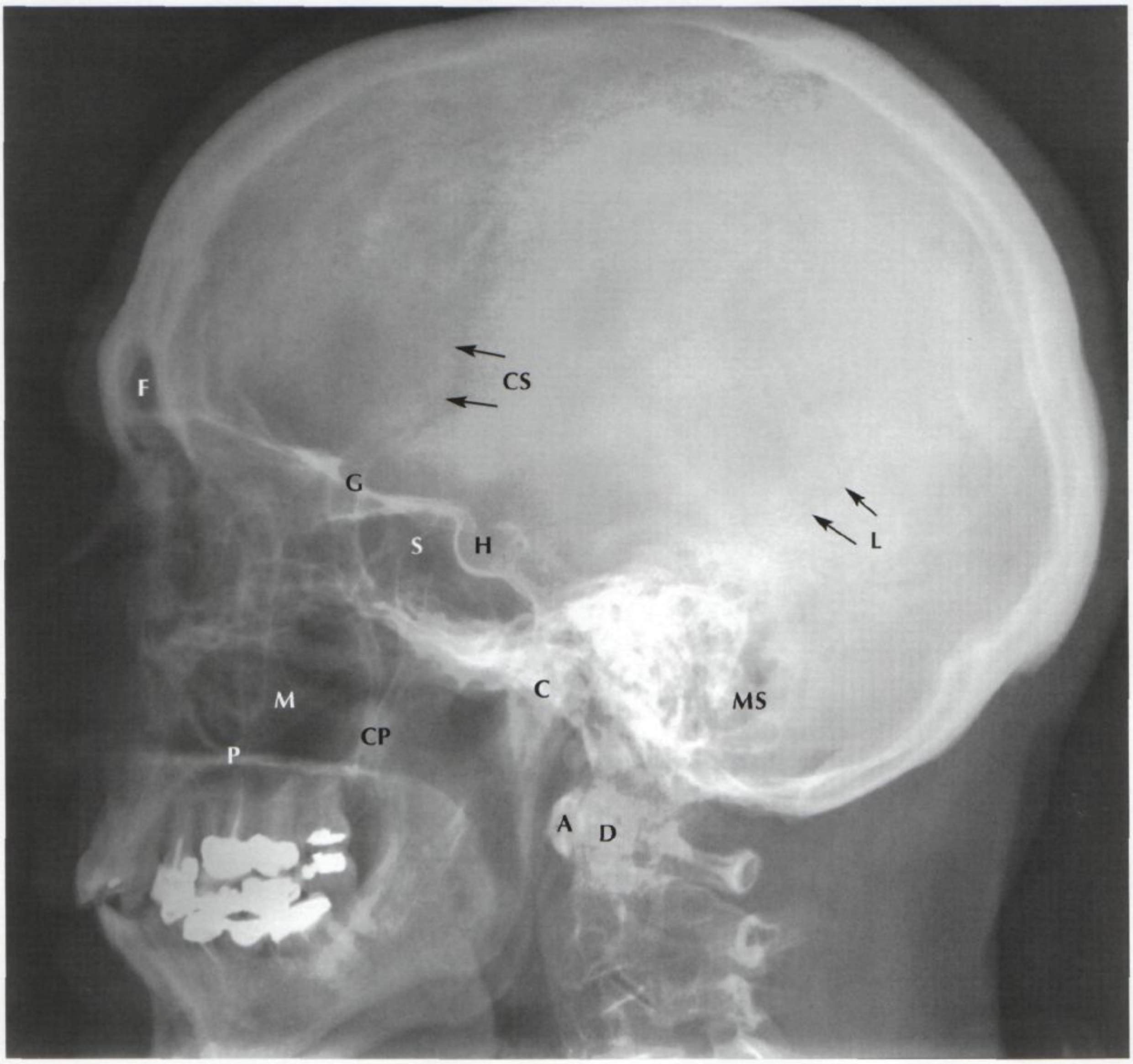




*Superficially, mastoid process forms posterior boundary

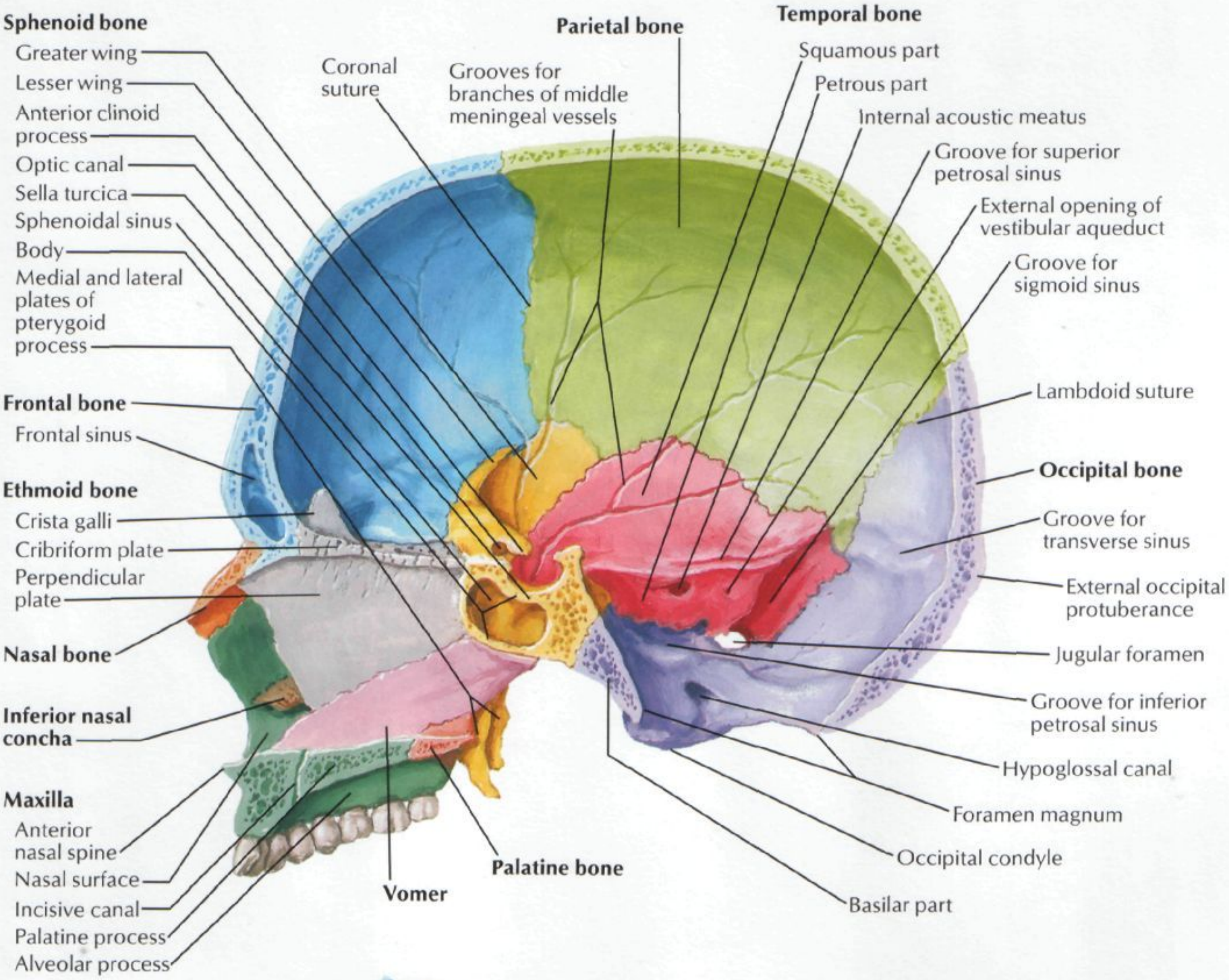
Skull: Lateral Radiograph

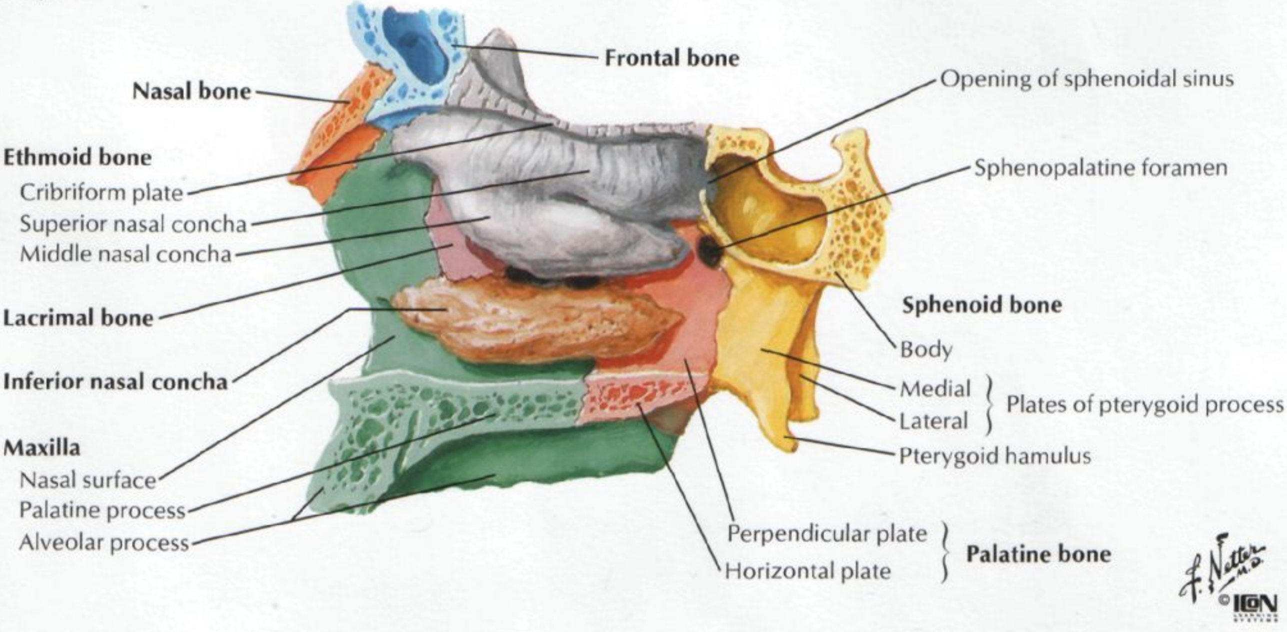
SEE ALSO PLATE 4



A	Anterior arch of atlas (CI vertebra)
C	Condyle of mandible
CP	Coronoid process of mandible
CS	Coronal suture
D	Dens of axis (C2 vertebra)
F	Frontal sinus
G	Greater wing of sphenoid
H	Hypophyseal fossa
L	Lambdoid suture
M	Maxillary sinus
MS	Mastoid air cells
P	Palatine process of maxilla
S	Sphenoid sinus

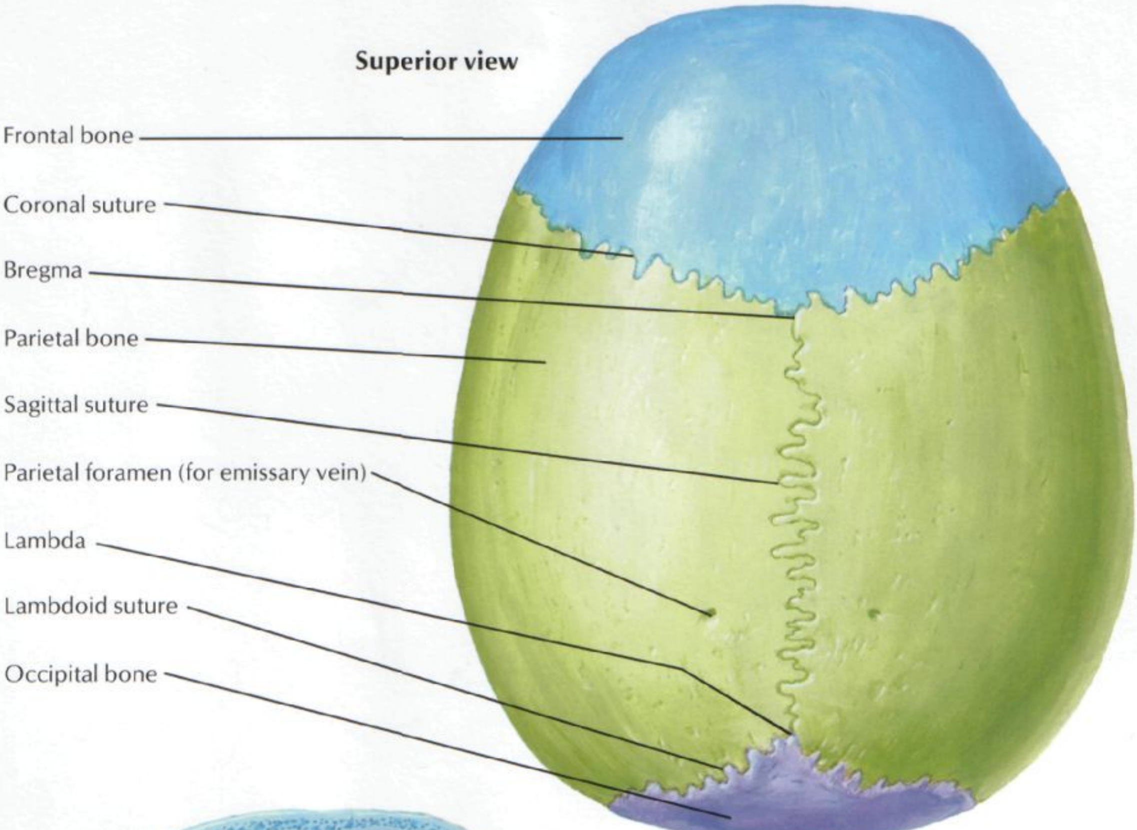
Skull: Midsagittal Section



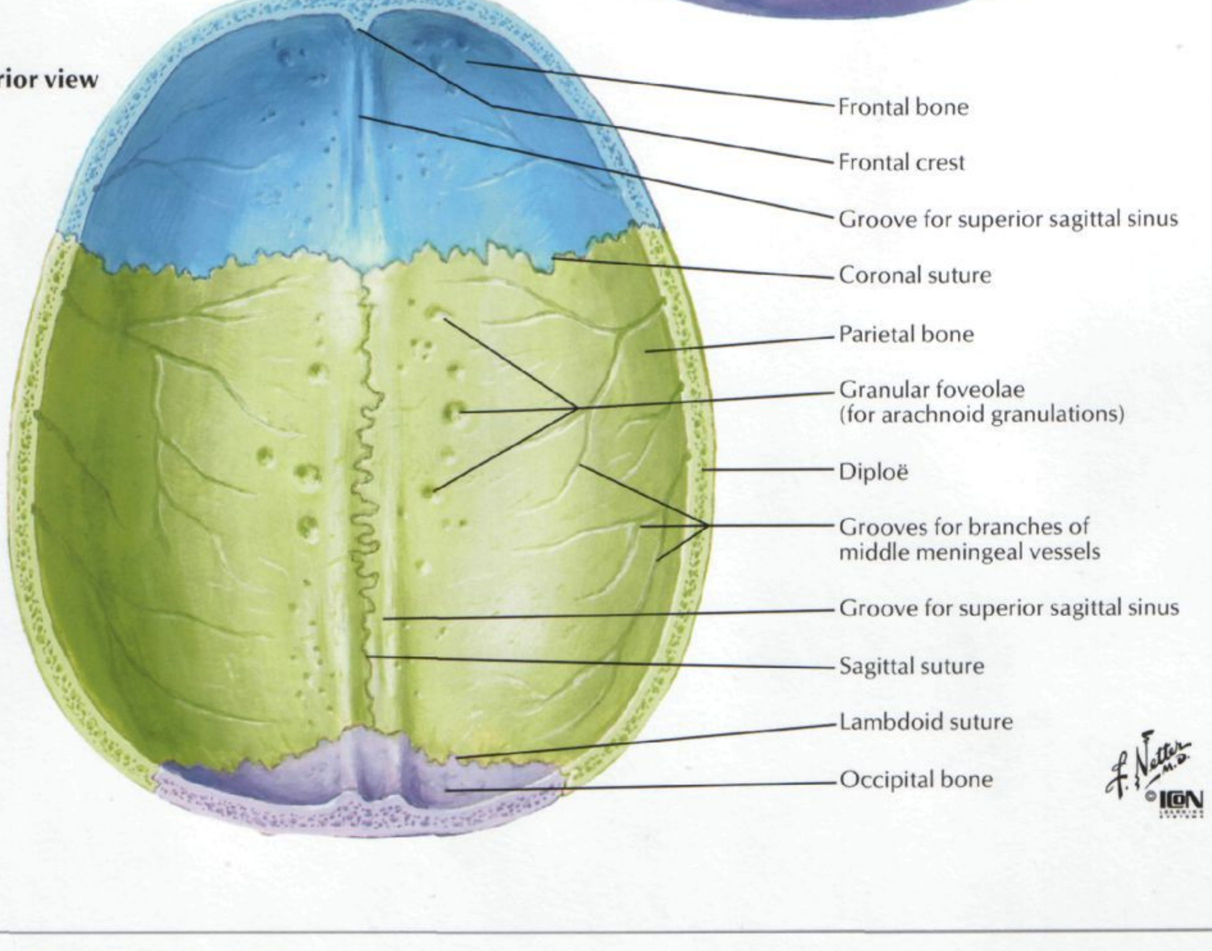


Calvaria

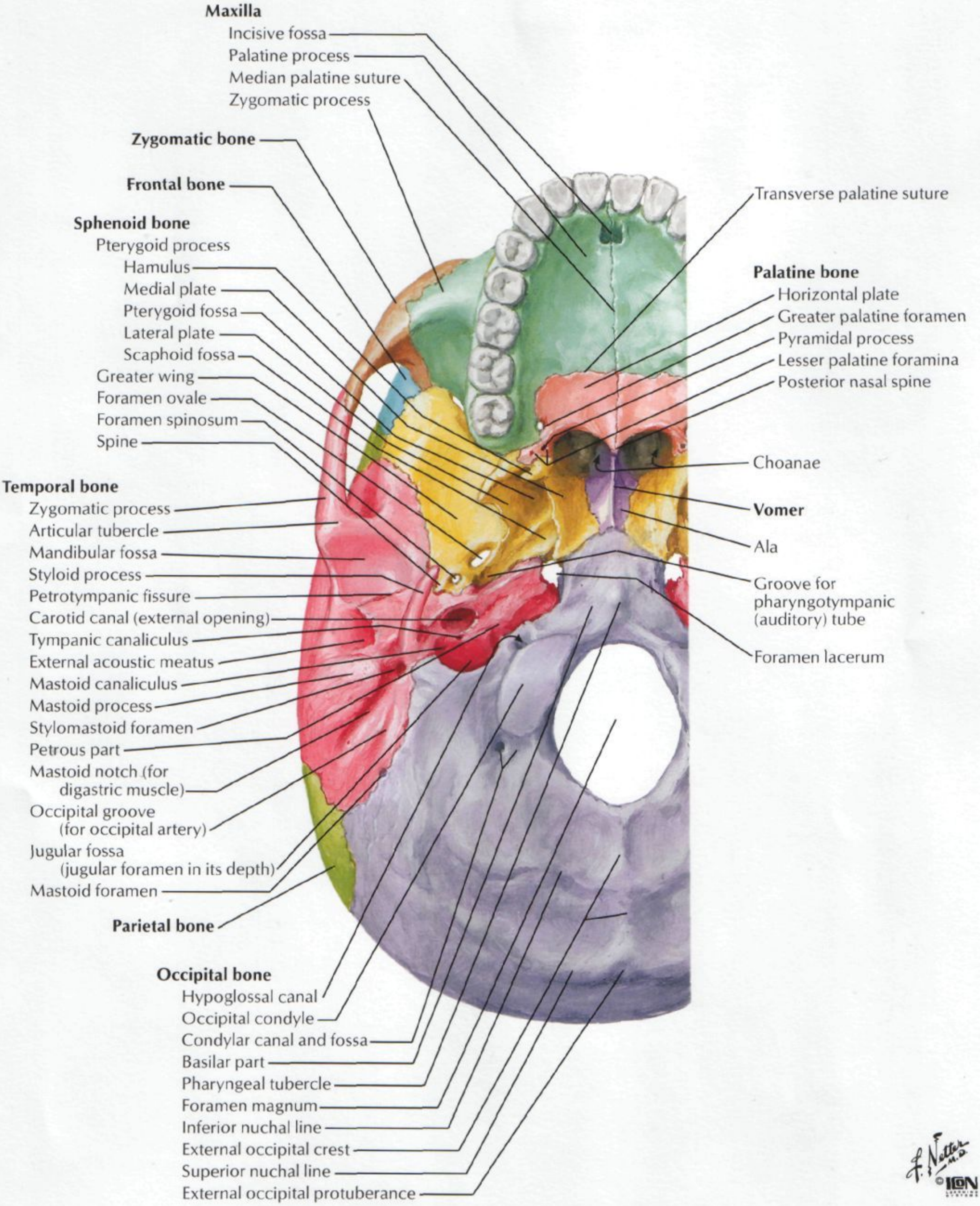
Superior view

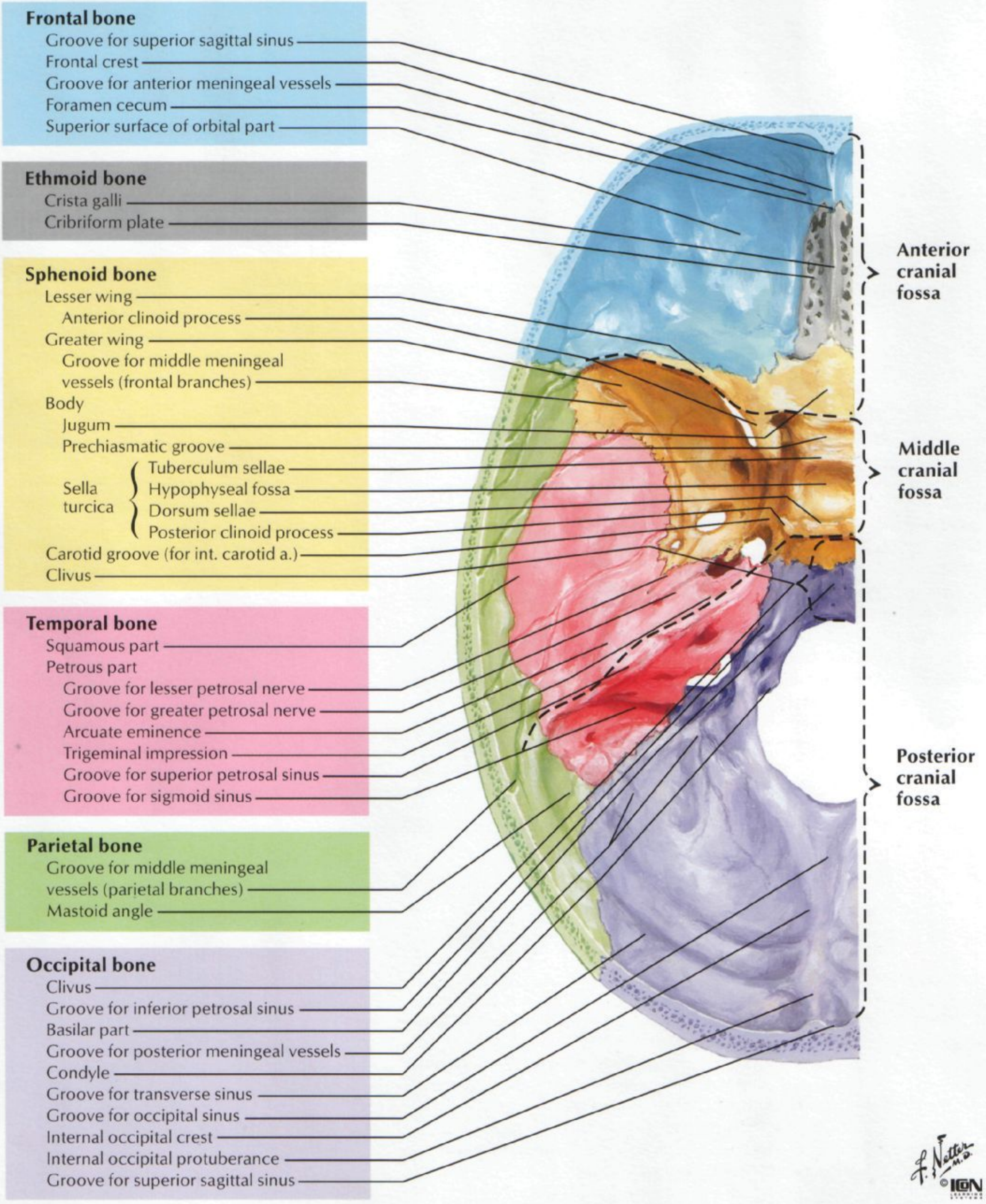


Inferior view



Cranial Base: Inferior View




Frontal bone
Groove for superior sagittal sinus
Frontal crest
Groove for anterior meningeal vessels
Foramen cecum
Superior surface of orbital part
Ethmoid bone
Crista galli
Cribriform plate
Sphenoid bone
Lesser wing
Anterior clinoid process
Greater wing
Groove for middle meningeal vessels (frontal branches)
Body
Jugum
Prechiasmatic groove
Sella turcica
Tuberculum sellae
Hypophyseal fossa
Dorsum sellae
Posterior clinoid process
Carotid groove (for int. carotid a.)
Clivus
Temporal bone
Squamous part
Petrous part
Groove for lesser petrosal nerve
Groove for greater petrosal nerve
Arcuate eminence
Trigeminal impression
Groove for superior petrosal sinus
Groove for sigmoid sinus
Parietal bone
Groove for middle meningeal vessels (parietal branches)
Mastoid angle
Occipital bone
Clivus
Groove for inferior petrosal sinus
Basilar part
Groove for posterior meningeal vessels
Condyle
Groove for transverse sinus
Groove for occipital sinus
Internal occipital crest
Internal occipital protuberance
Groove for superior sagittal sinus
Anterior cranial fossa
Middle cranial fossa
Posterior cranial fossa
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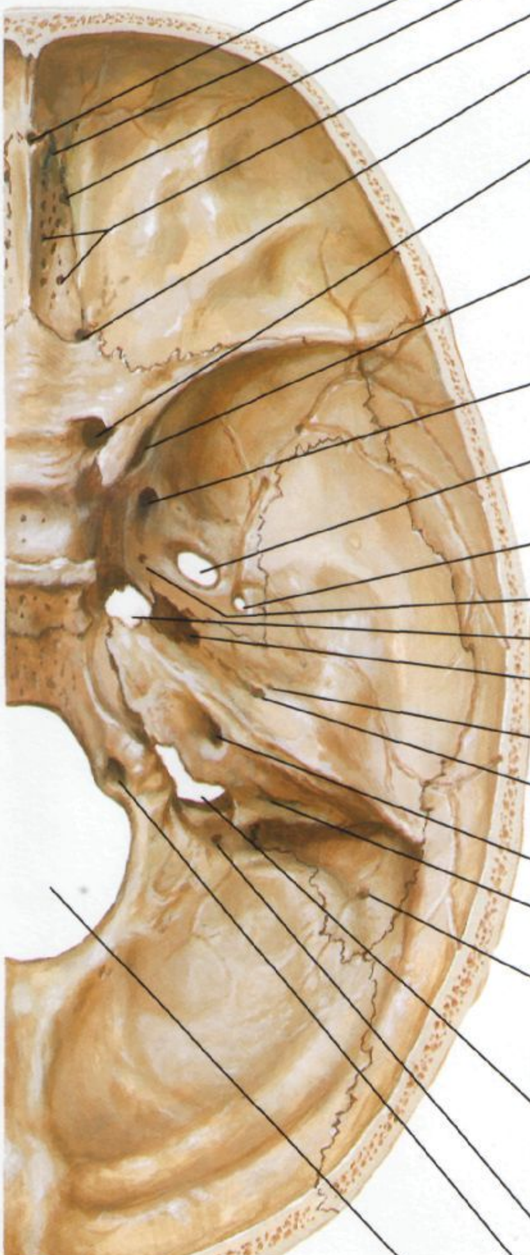
Foramina of Cranial Base: Superior View



Foramen cecum	Emissary vein to superior sagittal sinus
Nasal slit Anterior ethmoidal foramen	Anterior ethmoidal artery, vein and nerve
Foramina of cribriform plate	Olfactory nerve bundles
Posterior ethmoidal foramen	Posterior ethmoidal artery, vein and nerve
Optic canal	Optic nerve (II) Ophthalmic artery
Superior orbital fissure	Oculomotor nerve (III) Trochlear nerve (IV) Lacrimal, frontal and nasociliary branches of ophthalmic nerve (V_1) Abducent nerve (VI) Superior ophthalmic vein
Foramen rotundum	Maxillary nerve (V_2)
Foramen ovale	Mandibular nerve (V_3) Accessory meningeal artery Lesser petrosal nerve (occasionally)
Foramen spinosum	Middle meningeal artery and vein Meningeal branch of mandibular nerve
Sphenoid emissary foramen (Vesalius) (inconstant)	
Foramen lacerum	
Carotid canal for	Internal carotid artery Internal carotid nerve plexus
Hiatus for	Lesser petrosal nerve
Hiatus for	Greater petrosal nerve
Internal acoustic meatus	Facial nerve (VII) Vestibulocochlear nerve (VIII) Labyrinthine artery
External opening of vestibular aqueduct	Endolymphatic duct
Mastoid foramen (inconstant)	Emissary vein (and occasional branch of occipital artery)
Jugular foramen	Inferior petrosal sinus Glossopharyngeal nerve (IX) Vagus nerve (X) Accessory nerve (XI) Sigmoid sinus Posterior meningeal artery
Condylar canal (inconstant)	Emissary vein and meningeal branch of ascending pharyngeal artery
Hypoglossal canal	Hypoglossal nerve (XII)
Foramen magum	Medulla oblongata Meninges Vertebral arteries Meningeal branches of vertebral arteries Spinal roots of accessory nerves

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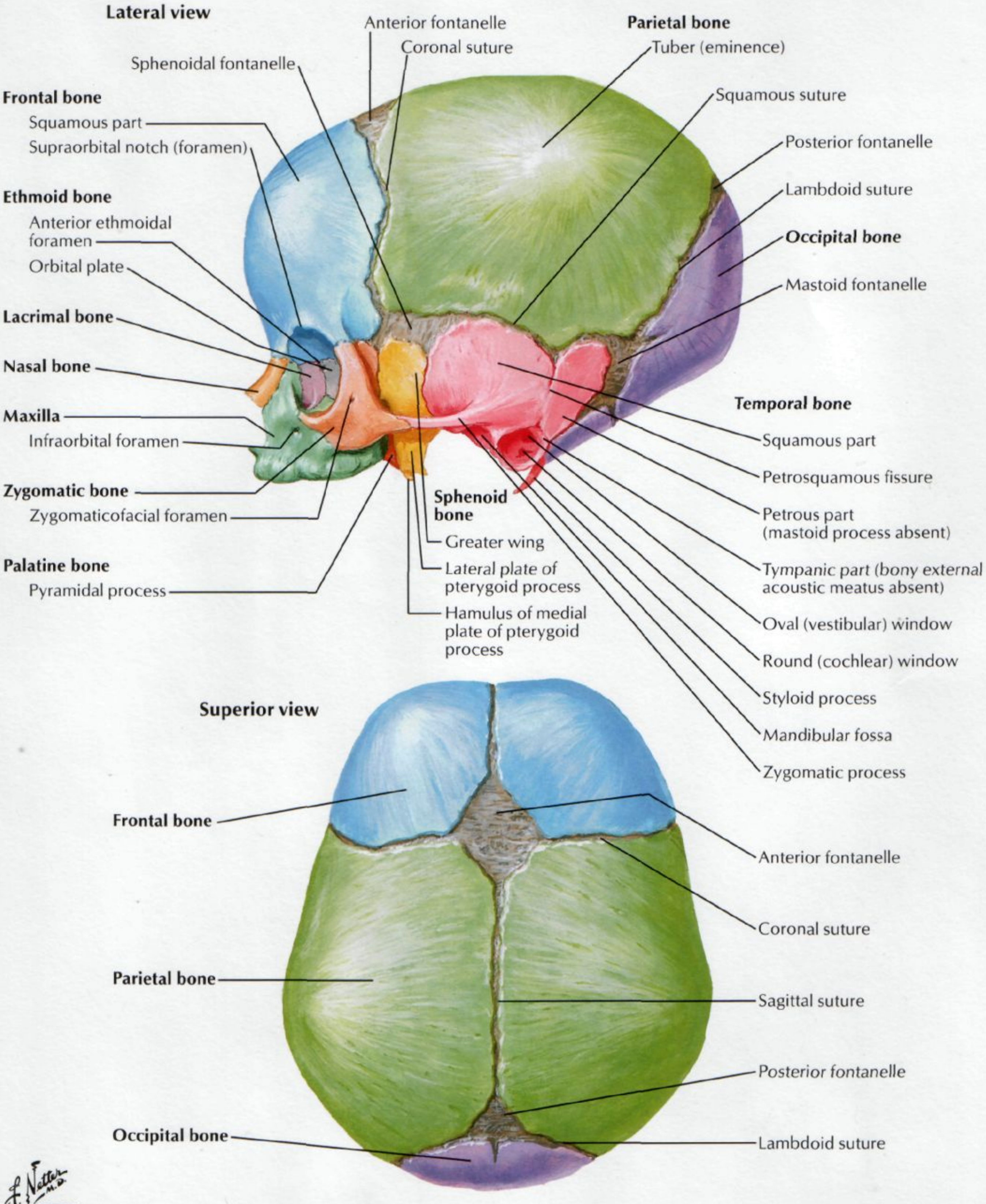
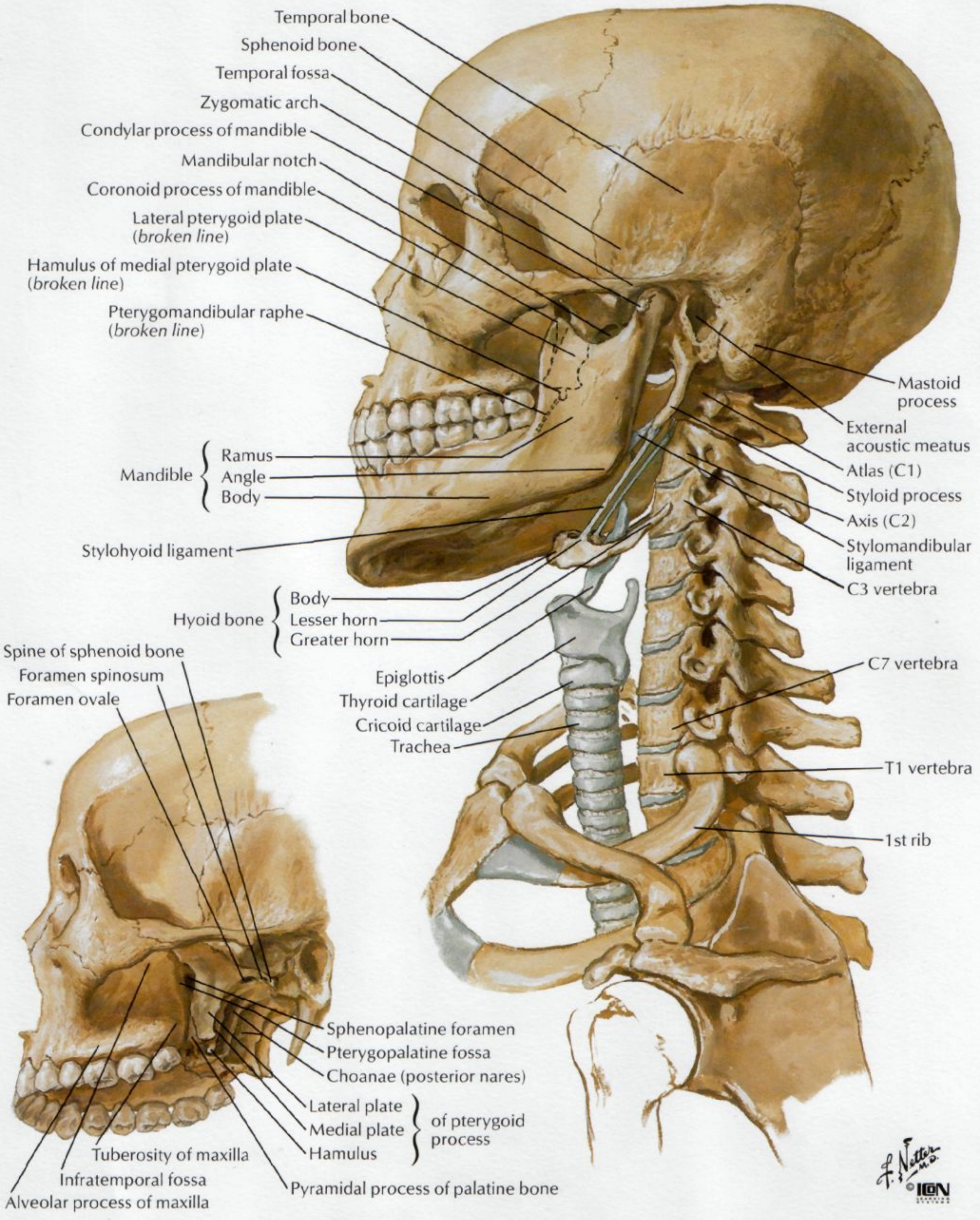
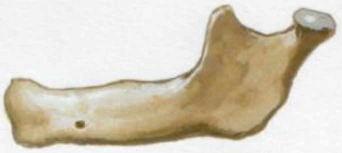
Skull of Newborn



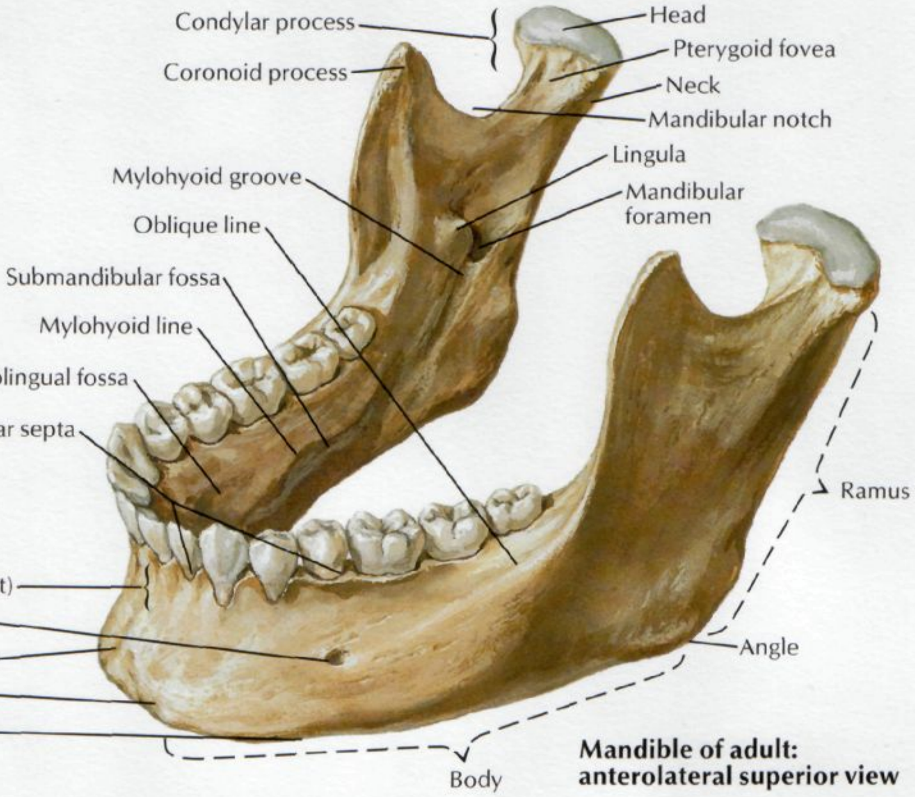
Bony Framework of Head and Neck



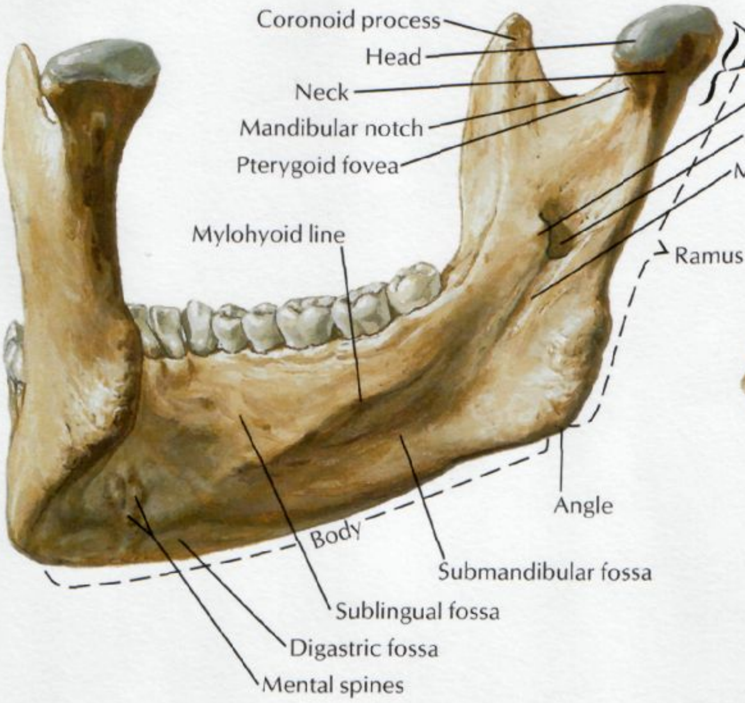
Mandible



Mandible of infant



Mandible of adult: anterolateral superior view



Mandible of adult: left posterior view

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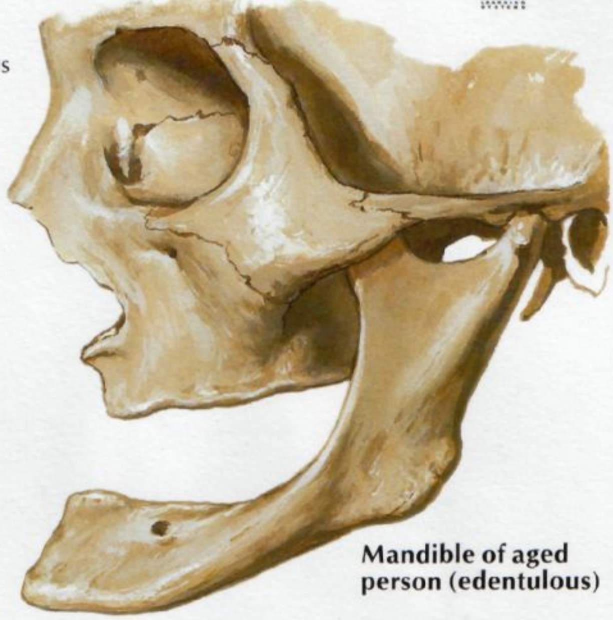
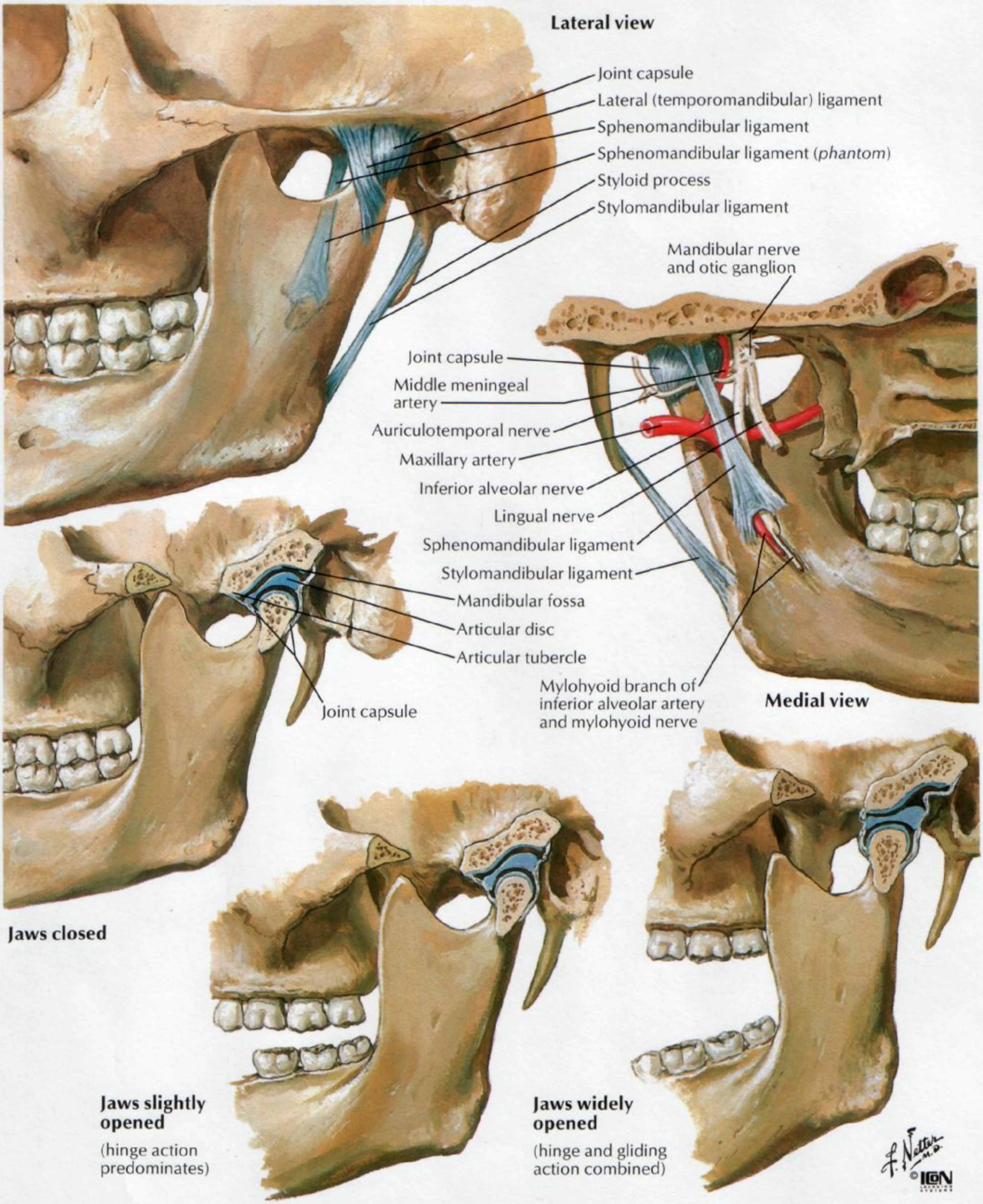


Mandible of aged person (edentulous)

Temporomandibular Joint



Lateral view

Medial view

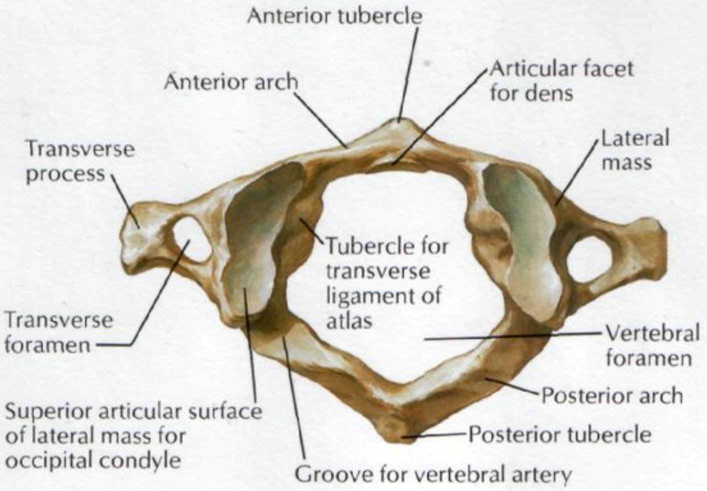
Jaws closed

Jaws slightly opened
(hinge action predominates)

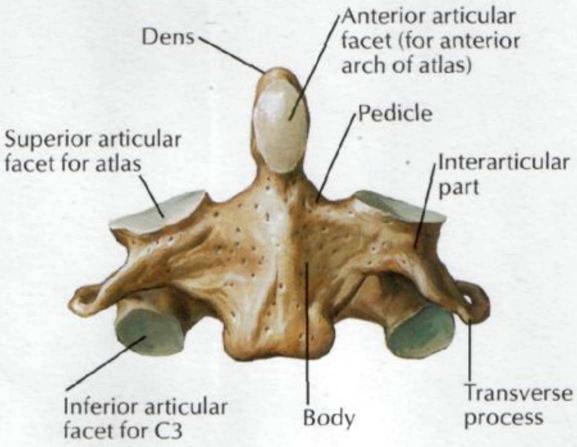
Jaws widely opened
(hinge and gliding action combined)

Cervical Vertebrae: Atlas and Axis

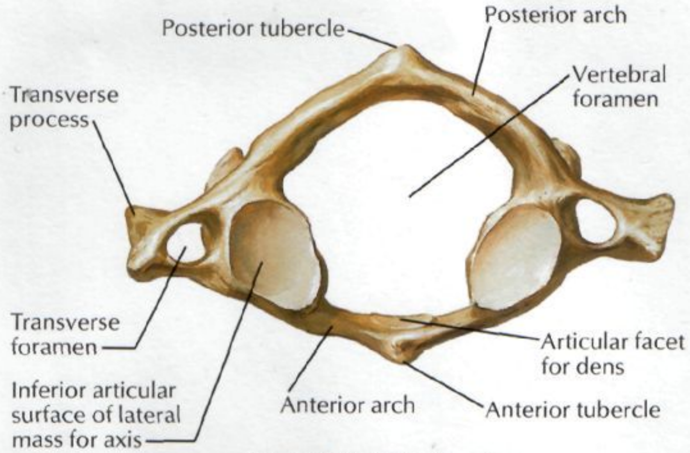
SEE ALSO PLATES 12, 146



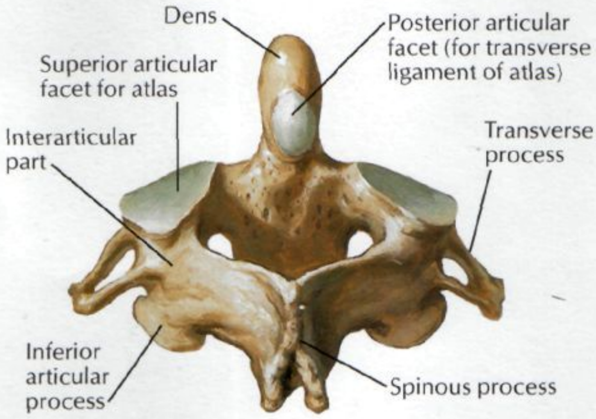
Atlas (C1): superior view


Dens
Anterior articular facet (for anterior arch of atlas)
Pedicle
Superior articular facet for atlas
Interarticular part
Inferior articular facet for C3
Body
Transverse process

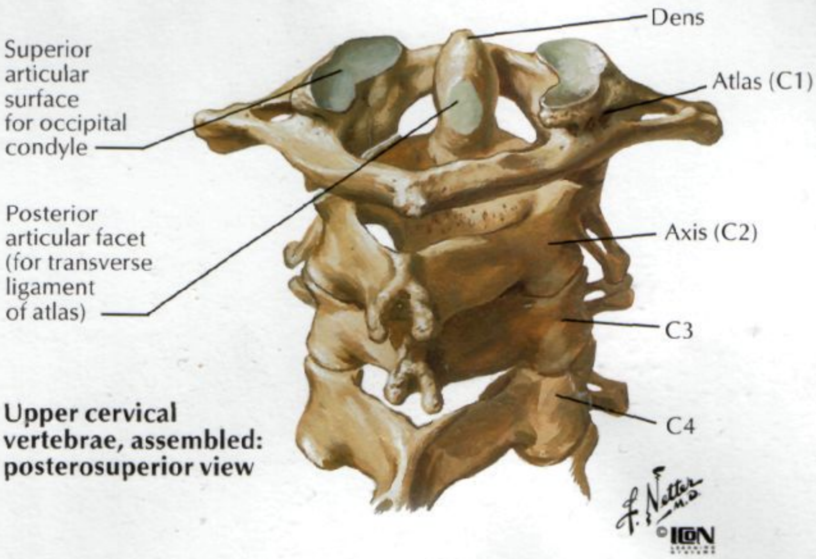
Axis (C2): anterior view



Atlas (C1): inferior view


Dens
Posterior articular facet (for transverse ligament of atlas)
Superior articular facet for atlas
Transverse process
Interarticular part
Inferior articular process
Spinous process

Axis (C2): posterosuperior view


Dens
Superior articular surface for occipital condyle
Atlas (C1)
Posterior articular facet (for transverse ligament of atlas)
Axis (C2)
C3
C4
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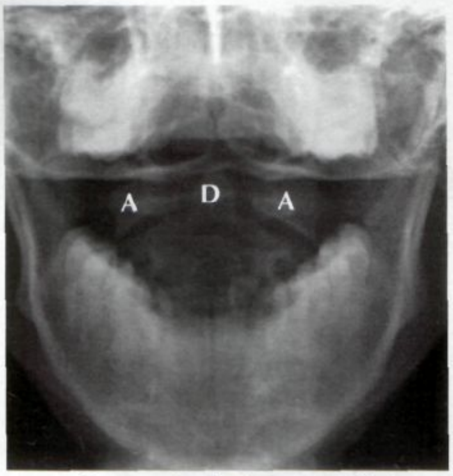
Upper cervical vertebrae, assembled: posterosuperior view



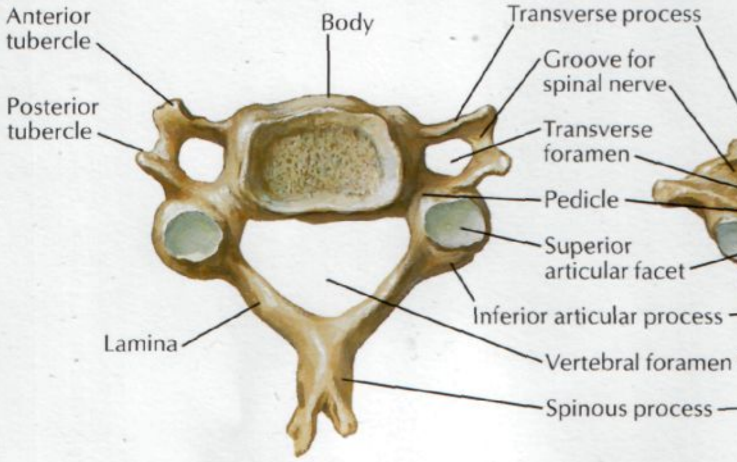
Radiograph of atlantoaxial joint

A Lateral masses of atlas (CI vertebra)

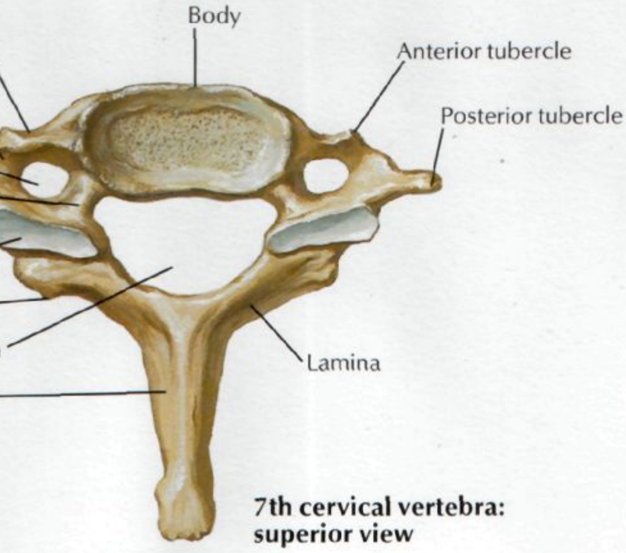
D Dens of axis (C2 vertebra)

Cervical Vertebrae (continued)

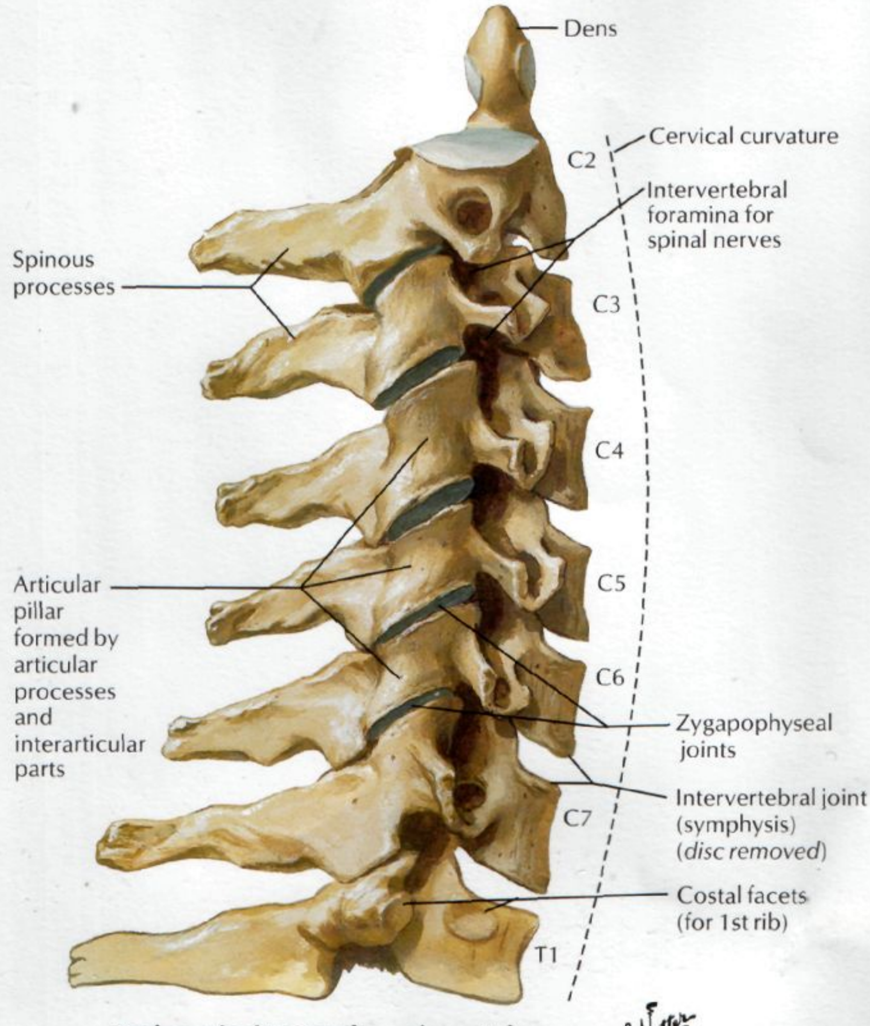
SEE ALSO PLATES 12, 146



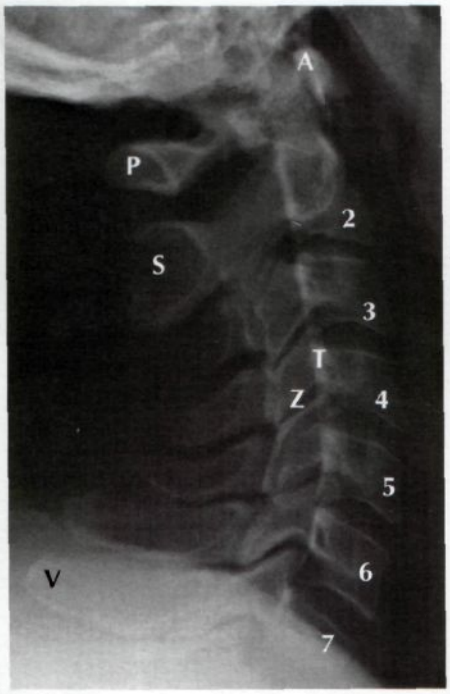
4th cervical vertebra: superior view



7th cervical vertebra: superior view


Dens
C2
Cervical curvature
Intervertebral foramina for spinal nerves
Spinous processes
C3
C4
Articular pillar formed by articular processes and interarticular parts
C5
C6
Zygapophyseal joints
C7
Intervertebral joint (symphysis) (*disc removed*)
Costal facets (for 1st rib)
T1

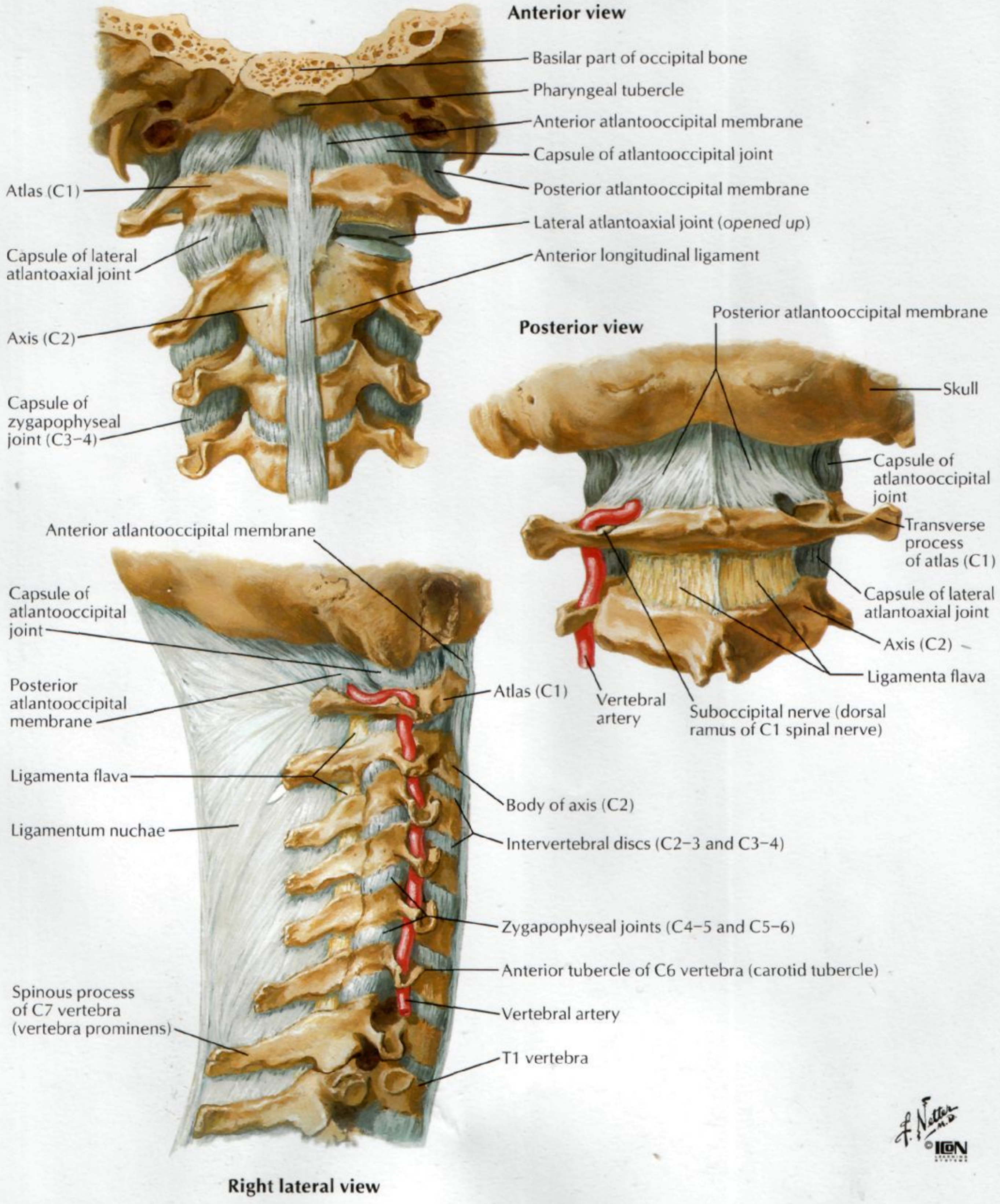
2nd cervical to 1st thoracic vertebrae: right lateral view



Cervical vertebrae: lateral radiograph

A Anterior arch of atlas
P Posterior arch of atlas
S Spinous process
T Transverse process
V Vertebra prominens (spinous process of C7)
Z Zygapophyseal joint
Bodies of 2–7 cervical vertebrae are numbered

External Craniocervical Ligaments


Anterior view
Basilar part of occipital bone
Pharyngeal tubercle
Anterior atlantooccipital membrane
Capsule of atlantooccipital joint
Atlas (C1)
Posterior atlantooccipital membrane
Lateral atlantoaxial joint (*opened up*)
Capsule of lateral atlantoaxial joint
Anterior longitudinal ligament
Axis (C2)
Capsule of zygapophyseal joint (C3–4)
Posterior view
Posterior atlantooccipital membrane
Skull
Capsule of atlantooccipital joint
Transverse process of atlas (C1)
Capsule of lateral atlantoaxial joint
Axis (C2)
Ligamenta flava
Vertebral artery
Suboccipital nerve (dorsal ramus of C1 spinal nerve)
Anterior atlantooccipital membrane
Capsule of atlantooccipital joint
Posterior atlantooccipital membrane
Atlas (C1)
Ligamenta flava
Body of axis (C2)
Ligamentum nuchae
Intervertebral discs (C2–3 and C3–4)
Zygapophyseal joints (C4–5 and C5–6)
Anterior tubercle of C6 vertebra (carotid tubercle)
Spinous process of C7 vertebra (vertebra prominens)
Vertebral artery
T1 vertebra
Right lateral view
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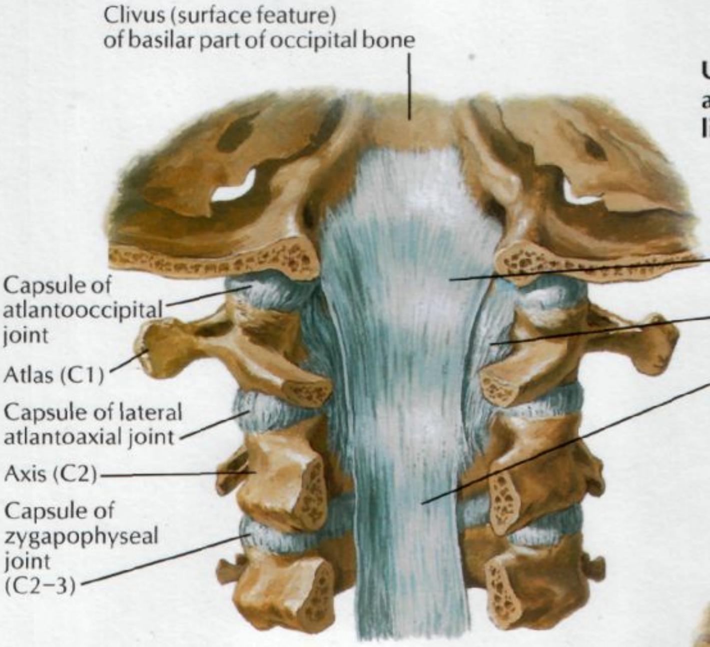
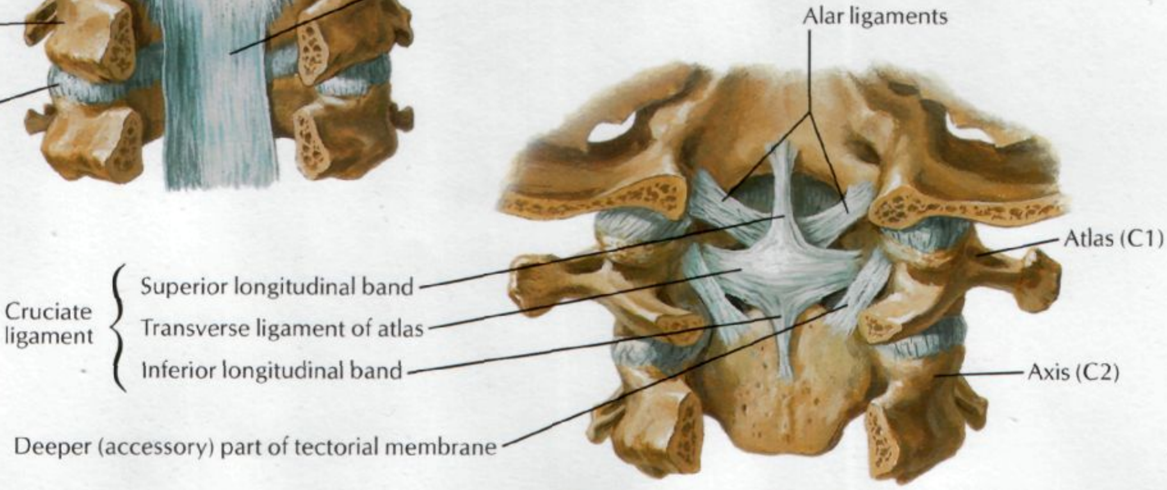
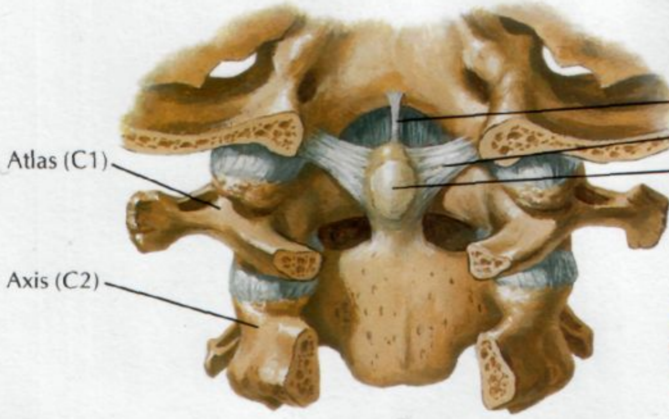
Internal Craniocervical Ligaments


Clivus (surface feature) of basilar part of occipital bone
Capsule of atlantooccipital joint
Atlas (C1)
Capsule of lateral atlantoaxial joint
Axis (C2)
Capsule of zygapophyseal joint (C2–3)
Tectorial membrane
Deeper (accessory) part of tectorial membrane
Posterior longitudinal ligament

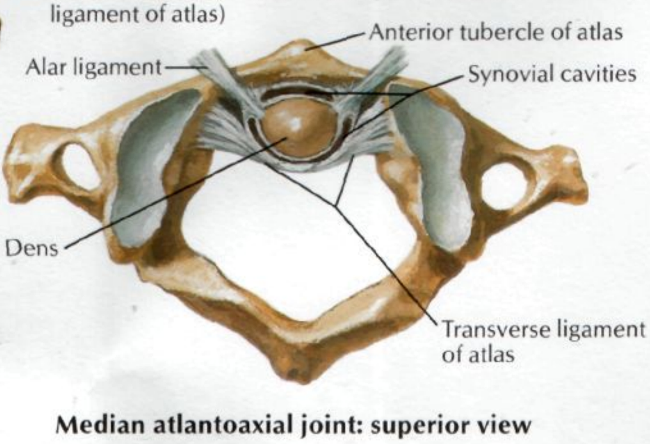
Upper part of vertebral canal with spinous processes and parts of vertebral arches removed to expose ligaments on posterior vertebral bodies: posterior view


Alar ligaments
Atlas (C1)
Cruciate ligament
Superior longitudinal band
Transverse ligament of atlas
Inferior longitudinal band
Axis (C2)
Deeper (accessory) part of tectorial membrane

Principal part of tectorial membrane removed to expose deeper ligaments: posterior view


Apical ligament of dens
Alar ligament
Posterior articular facet of dens (for transverse ligament of atlas)
Atlas (C1)
Axis (C2)

Cruciate ligament removed to show deepest ligaments: posterior view



Median atlantoaxial joint: superior view

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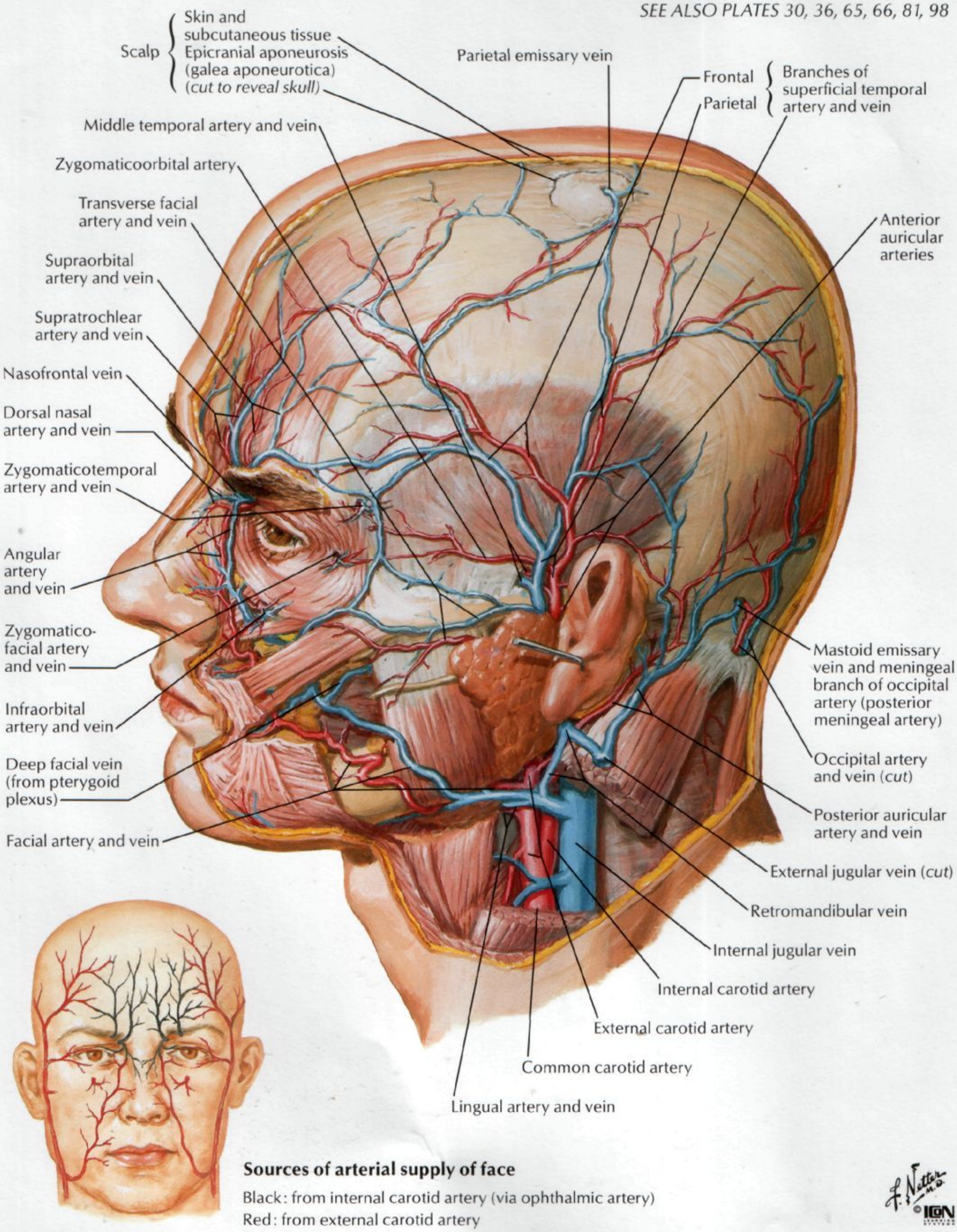
Superficial Arteries and Veins of Face and Scalp

SEE ALSO PLATES 30, 36, 65, 66, 81, 98

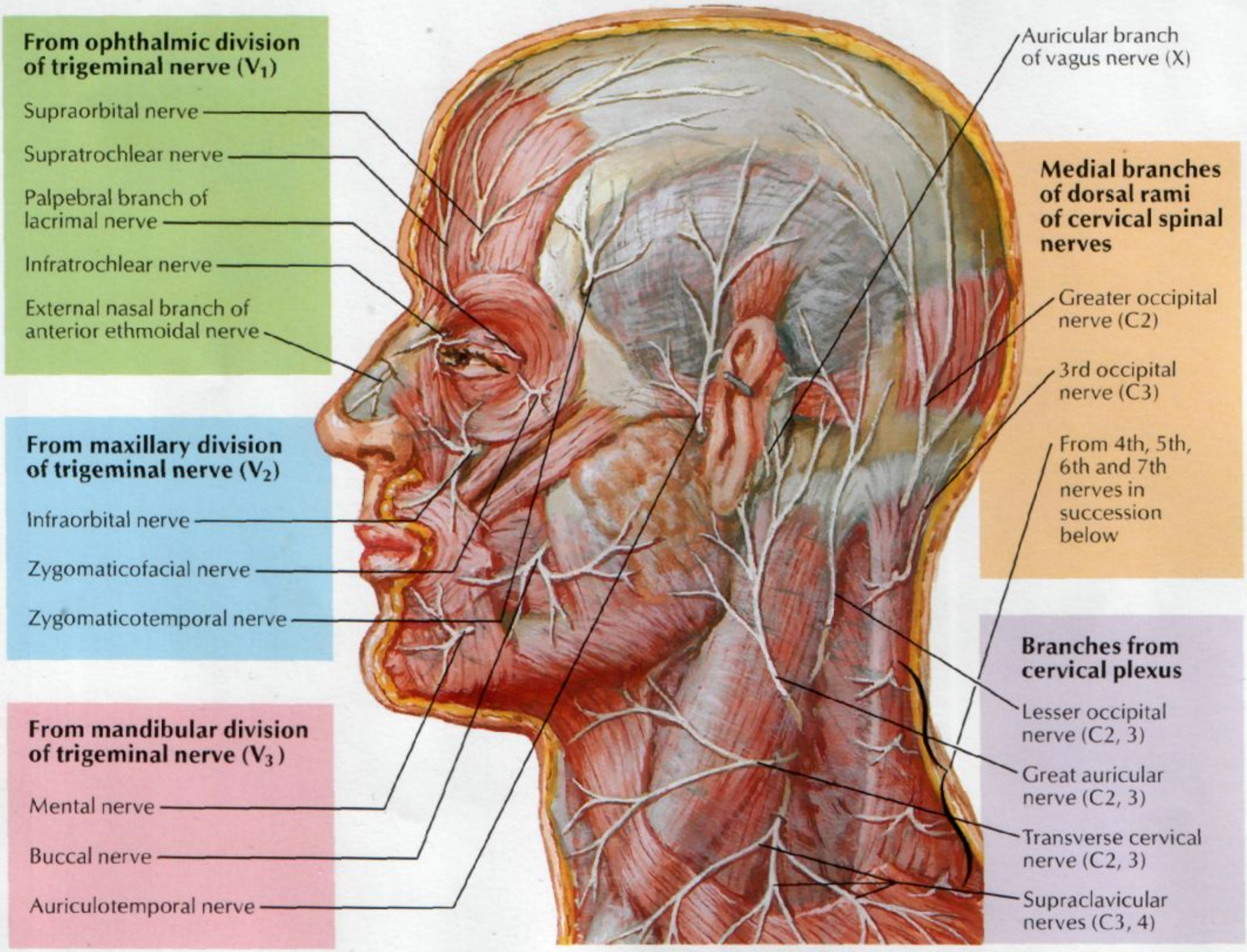

Scalp
Skin and subcutaneous tissue
Epicranial aponeurosis (galea aponeurotica) (*cut to reveal skull*)
Parietal emissary vein
Frontal
Parietal
Branches of superficial temporal artery and vein
Middle temporal artery and vein
Zygomaticoorbital artery
Transverse facial artery and vein
Supraorbital artery and vein
Supratrochlear artery and vein
Nasofrontal vein
Dorsal nasal artery and vein
Zygomaticotemporal artery and vein
Angular artery and vein
Zygomatico-facial artery and vein
Infraorbital artery and vein
Deep facial vein (from pterygoid plexus)
Facial artery and vein
Anterior auricular arteries
Mastoid emissary vein and meningeal branch of occipital artery (posterior meningeal artery)
Occipital artery and vein (*cut*)
Posterior auricular artery and vein
External jugular vein (*cut*)
Retromandibular vein
Internal jugular vein
Internal carotid artery
External carotid artery
Common carotid artery
Lingual artery and vein

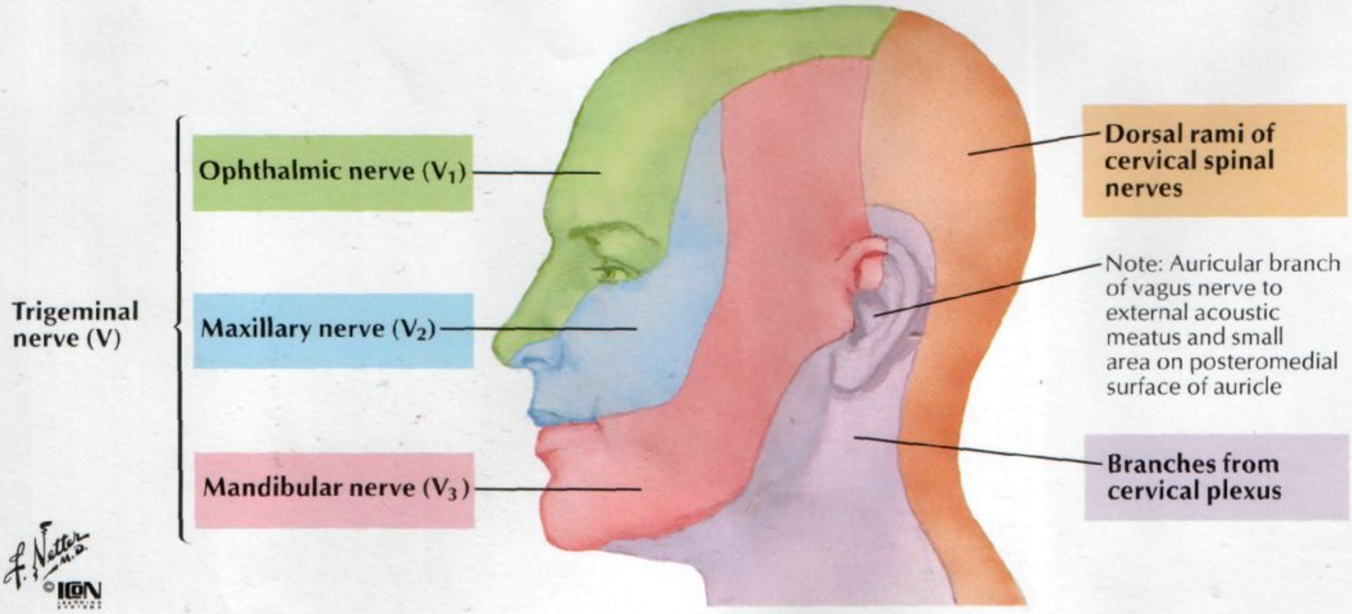
Sources of arterial supply of face

Black: from internal carotid artery (via ophthalmic artery)
Red: from external carotid artery

Cutaneous Nerves of Head and Neck

SEE ALSO PLATES 28, 32, 41, 42, 116


From ophthalmic division of trigeminal nerve (V_1)
Supraorbital nerve
Supratrochlear nerve
Palpebral branch of lacrimal nerve
Infratrochlear nerve
External nasal branch of anterior ethmoidal nerve
From maxillary division of trigeminal nerve (V_2)
Infraorbital nerve
Zygomaticofacial nerve
Zygomaticotemporal nerve
From mandibular division of trigeminal nerve (V_3)
Mental nerve
Buccal nerve
Auriculotemporal nerve
Auricular branch of vagus nerve (X)
Medial branches of dorsal rami of cervical spinal nerves
Greater occipital nerve (C2)
3rd occipital nerve (C3)
From 4th, 5th, 6th and 7th nerves in succession below
Branches from cervical plexus
Lesser occipital nerve (C2, 3)
Great auricular nerve (C2, 3)
Transverse cervical nerve (C2, 3)
Supraclavicular nerves (C3, 4)


Trigeminal nerve (V)
Ophthalmic nerve (V_1)
Maxillary nerve (V_2)
Mandibular nerve (V_3)
Dorsal rami of cervical spinal nerves
Note: Auricular branch of vagus nerve to external acoustic meatus and small area on posteromedial surface of auricle
Branches from cervical plexus
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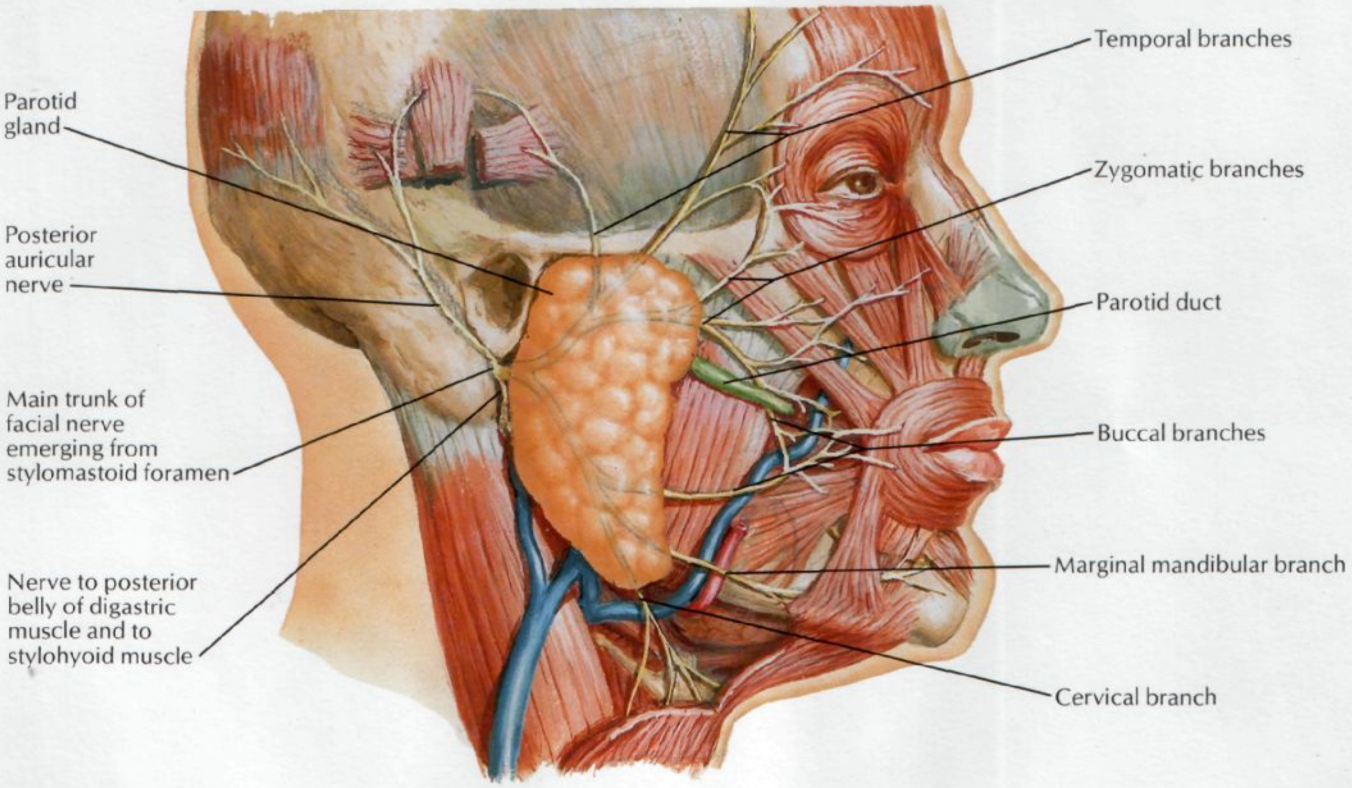
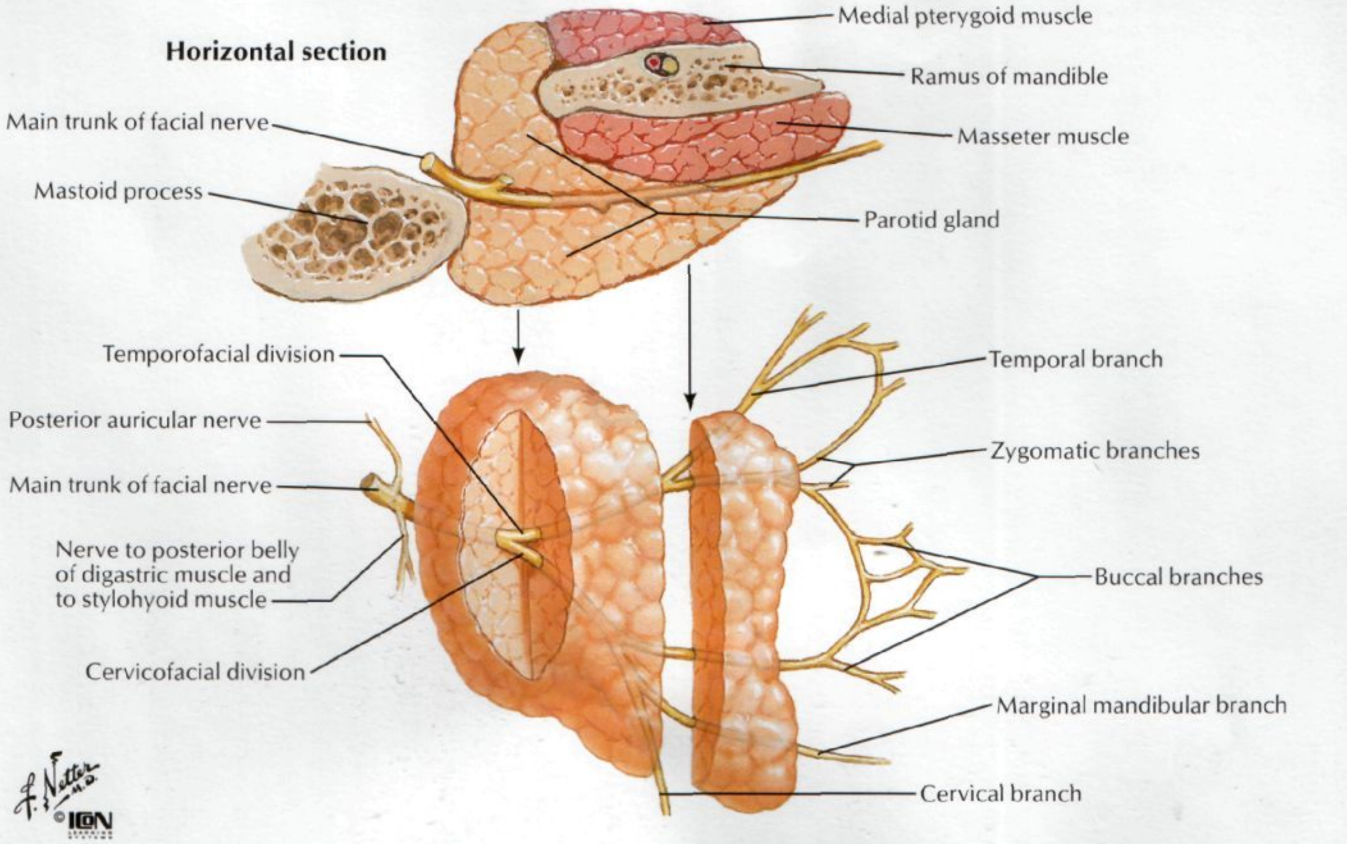
Facial Nerve Branches and Parotid Gland

SEE ALSO PLATE 117


Temporal branches
Parotid gland
Zygomatic branches
Posterior auricular nerve
Parotid duct
Main trunk of facial nerve emerging from stylomastoid foramen
Buccal branches
Marginal mandibular branch
Nerve to posterior belly of digastric muscle and to stylohyoid muscle
Cervical branch



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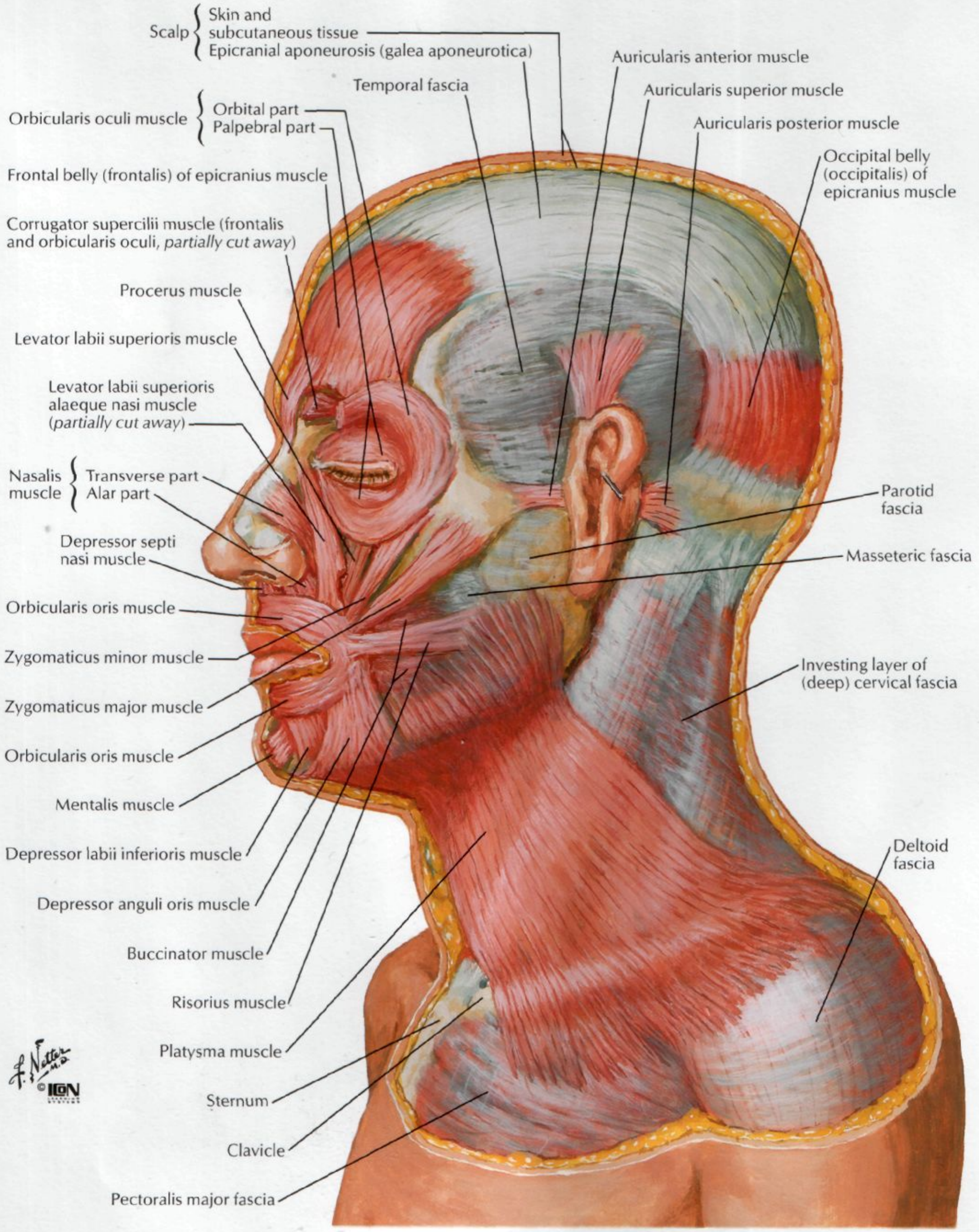
Muscles of Facial Expression: Lateral View


Scalp
Skin and subcutaneous tissue
Epicranial aponeurosis (galea aponeurotica)
Orbicularis oculi muscle
Orbital part
Palpebral part
Temporal fascia
Auricularis anterior muscle
Auricularis superior muscle
Auricularis posterior muscle
Occipital belly (occipitalis) of epicranius muscle
Frontal belly (frontalis) of epicranius muscle
Corrugator supercilii muscle (frontalis and orbicularis oculi, *partially cut away*)
Procerus muscle
Levator labii superioris muscle
Levator labii superioris alaeque nasi muscle (*partially cut away*)
Nasalis muscle
Transverse part
Alar part
Depressor septi nasi muscle
Orbicularis oris muscle
Zygomaticus minor muscle
Zygomaticus major muscle
Orbicularis oris muscle
Mentalis muscle
Depressor labii inferioris muscle
Depressor anguli oris muscle
Buccinator muscle
Risorius muscle
Platysma muscle
Sternum
Clavicle
Pectoralis major fascia
Parotid fascia
Masseteric fascia
Investing layer of (deep) cervical fascia
Deltoid fascia
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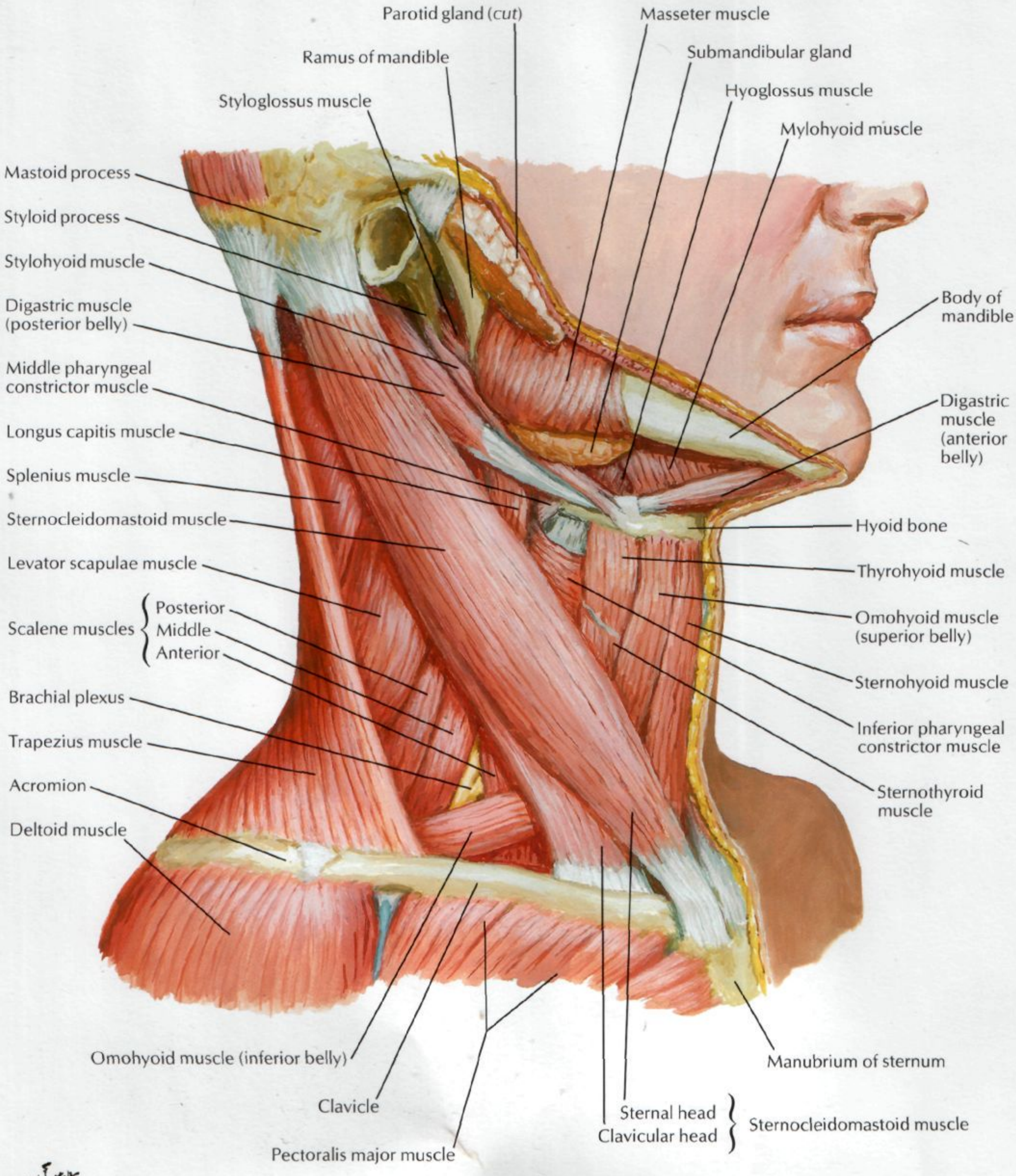
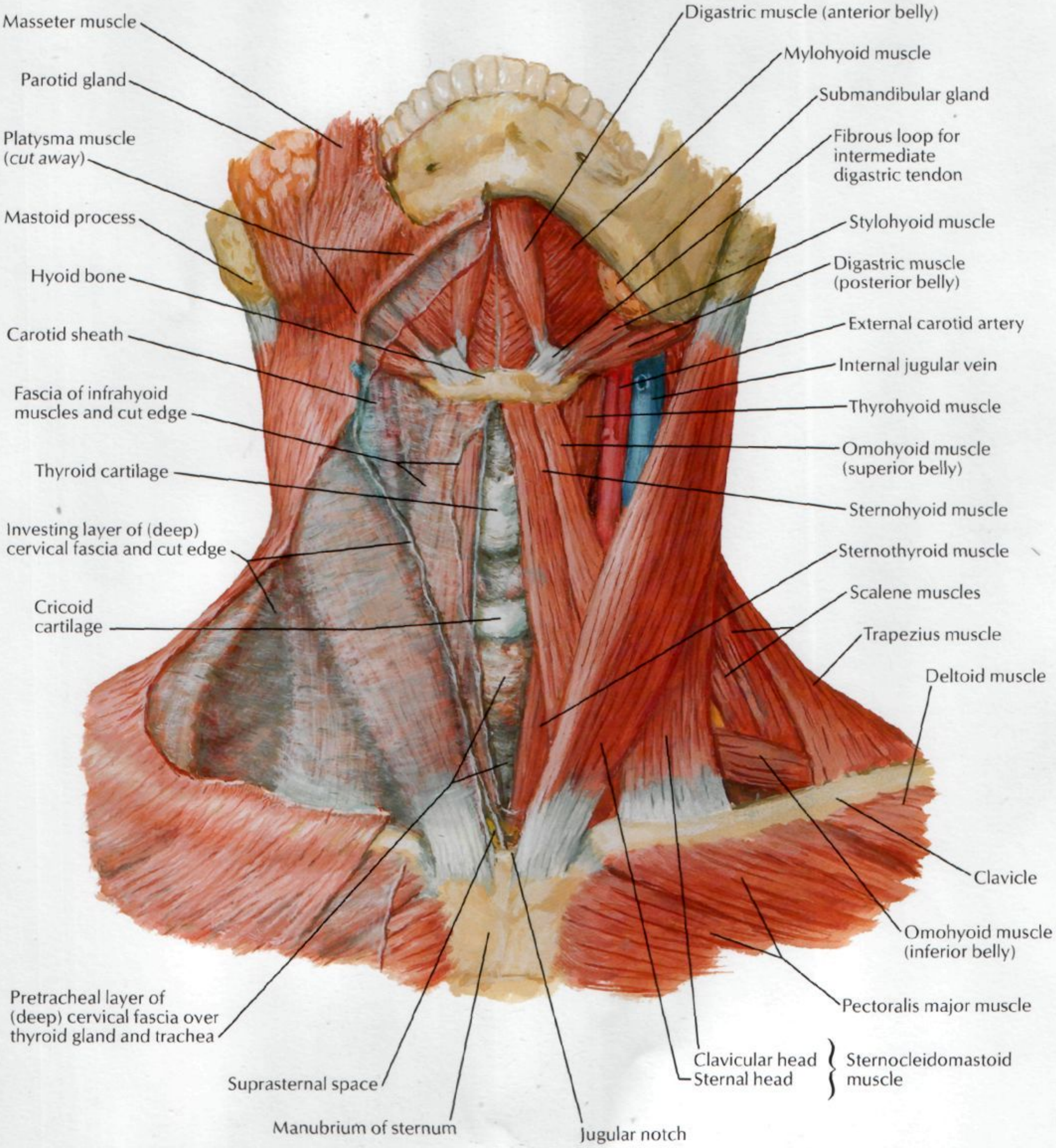
Muscles of Neck: Lateral View

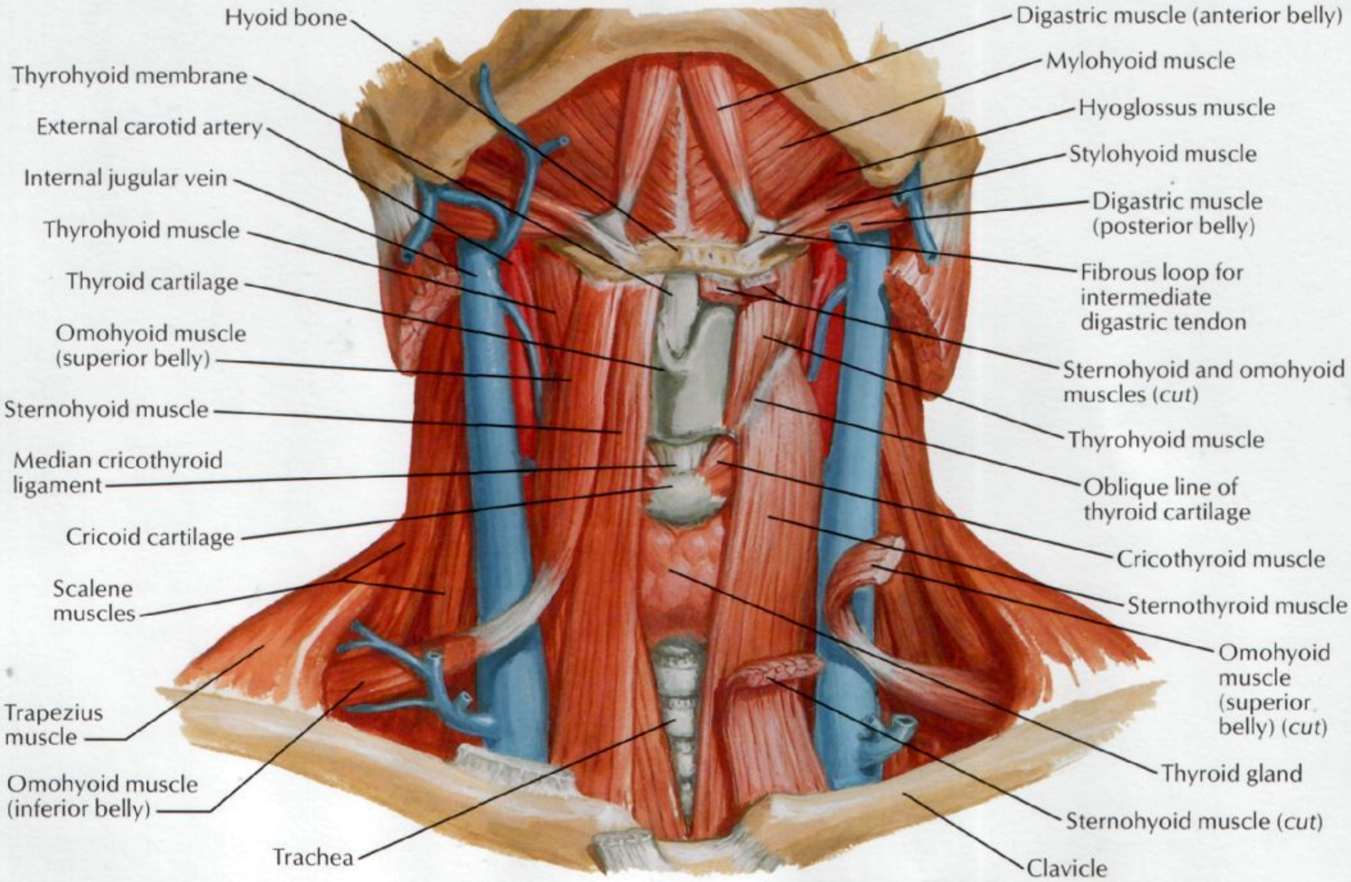


Muscles of Neck: Anterior View



Infrahyoid and Suprahyoid Muscles

SEE ALSO PLATE 49


Hyoid bone
Thyrohyoid membrane
External carotid artery
Internal jugular vein
Thyrohyoid muscle
Thyroid cartilage
Omohyoid muscle (superior belly)
Sternohyoid muscle
Median cricothyroid ligament
Cricoid cartilage
Scalene muscles
Trapezius muscle
Omohyoid muscle (inferior belly)
Trachea
Digastric muscle (anterior belly)
Mylohyoid muscle
Hyoglossus muscle
Stylohyoid muscle
Digastric muscle (posterior belly)
Fibrous loop for intermediate digastric tendon
Sternohyoid and omohyoid muscles (*cut*)
Thyrohyoid muscle
Oblique line of thyroid cartilage
Cricothyroid muscle
Sternothyroid muscle
Omohyoid muscle (superior belly) (*cut*)
Thyroid gland
Sternohyoid muscle (*cut*)
Clavicle

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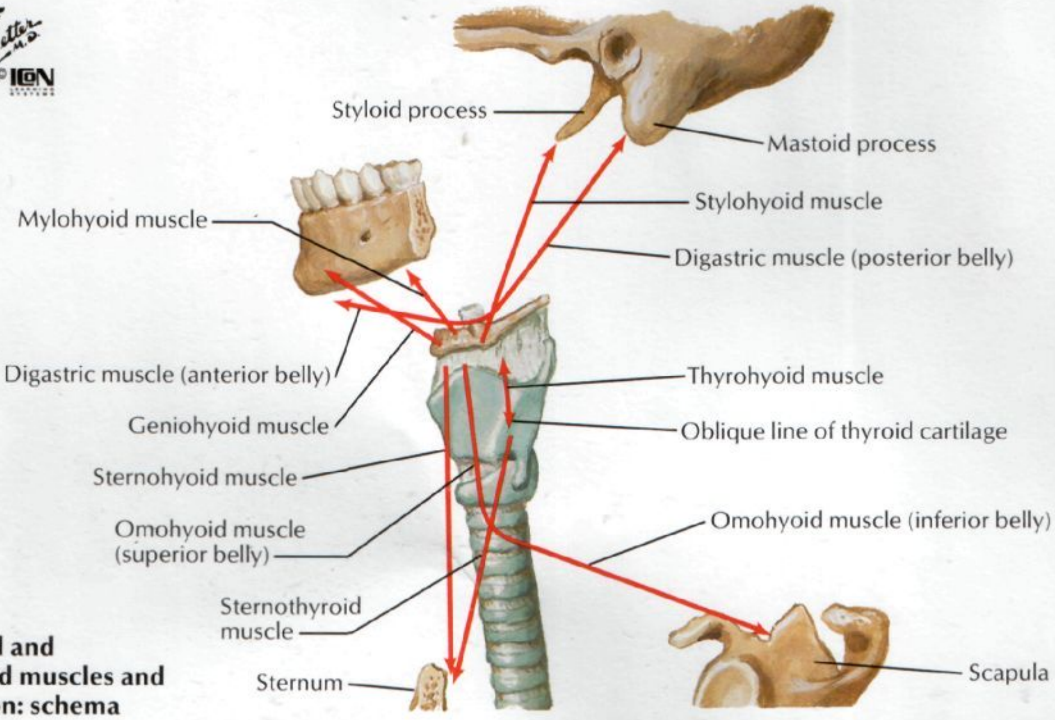
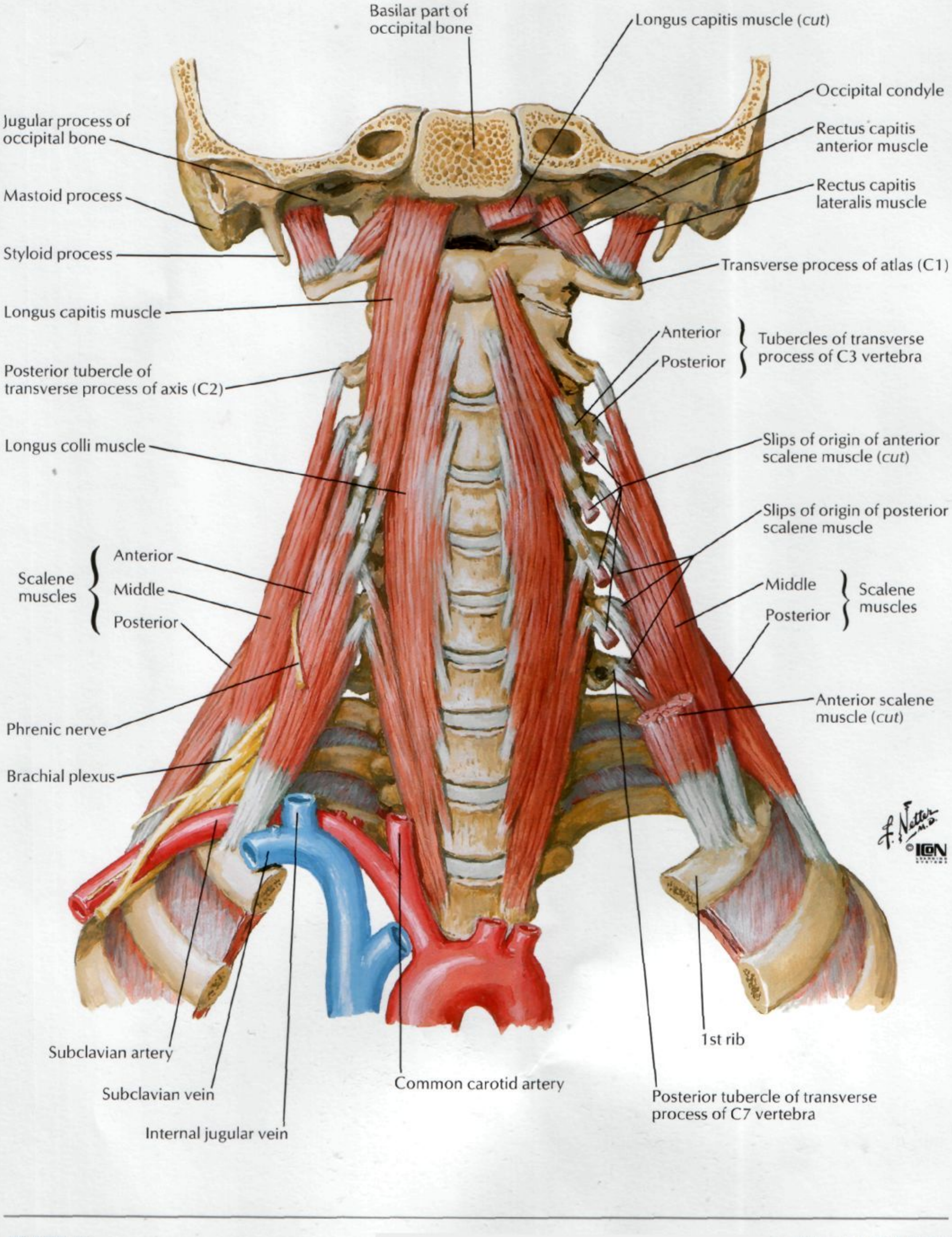

Styloid process
Mastoid process
Stylohyoid muscle
Mylohyoid muscle
Digastric muscle (posterior belly)
Digastric muscle (anterior belly)
Thyrohyoid muscle
Geniohyoid muscle
Oblique line of thyroid cartilage
Sternohyoid muscle
Omohyoid muscle (superior belly)
Omohyoid muscle (inferior belly)
Sternothyroid muscle
Sternum
Scapula

Infrahyoid and suprahyoid muscles and their action: schema

Scalene and Prevertebral Muscles


Basilar part of occipital bone
Longus capitis muscle (*cut*)
Occipital condyle
Jugular process of occipital bone
Rectus capitis anterior muscle
Mastoid process
Rectus capitis lateralis muscle
Styloid process
Transverse process of atlas (C1)
Longus capitis muscle
Anterior
Posterior
Tubercles of transverse process of C3 vertebra
Posterior tubercle of transverse process of axis (C2)
Longus colli muscle
Slips of origin of anterior scalene muscle (*cut*)
Slips of origin of posterior scalene muscle
Scalene muscles
Anterior
Middle
Posterior
Middle
Posterior
Scalene muscles
Phrenic nerve
Anterior scalene muscle (*cut*)
Brachial plexus
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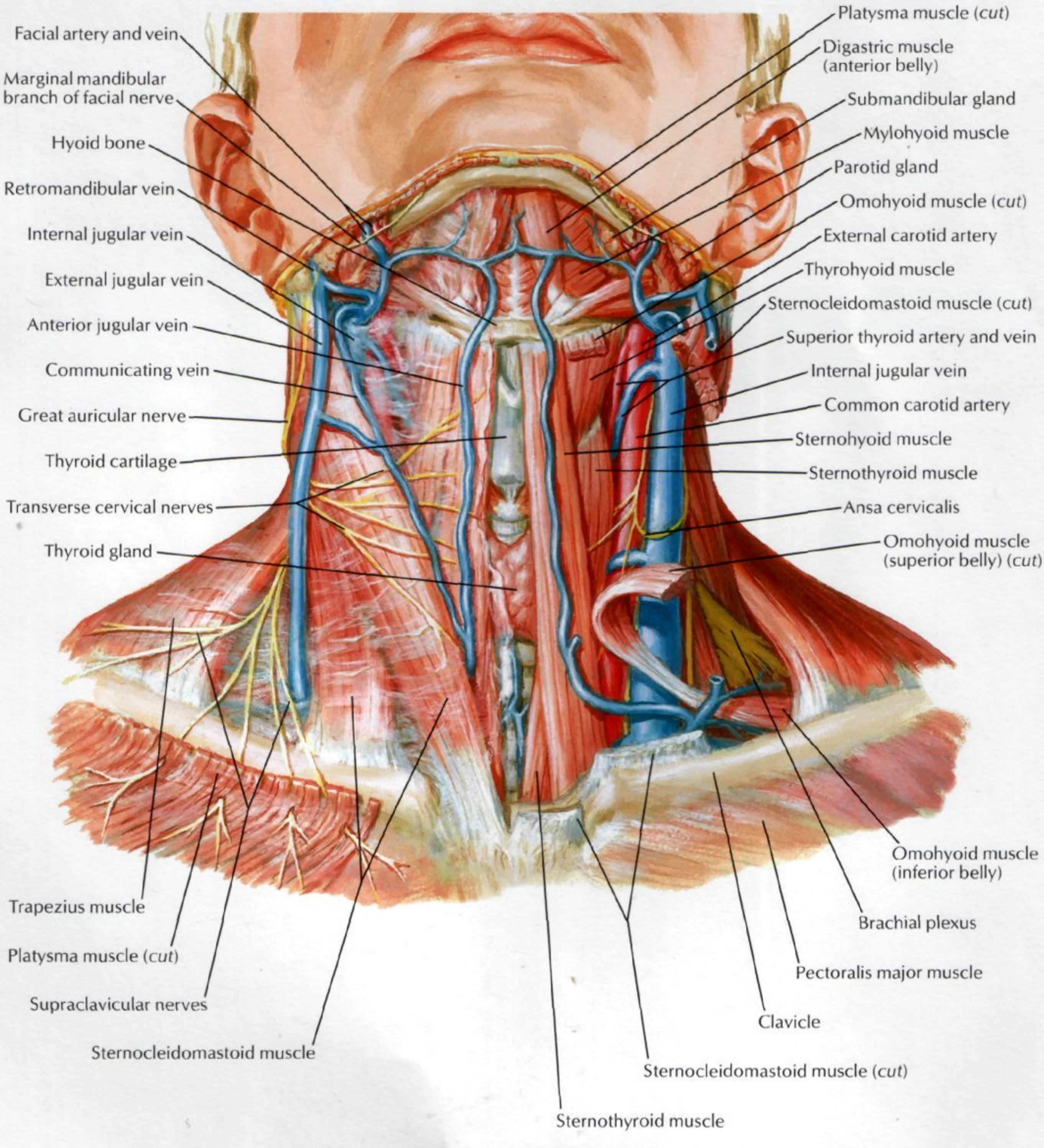
Subclavian artery
1st rib
Subclavian vein
Common carotid artery
Posterior tubercle of transverse process of C7 vertebra
Internal jugular vein

Superficial Veins and Cutaneous Nerves of Neck

FOR DEEP VEINS OF NECK SEE PLATE 66



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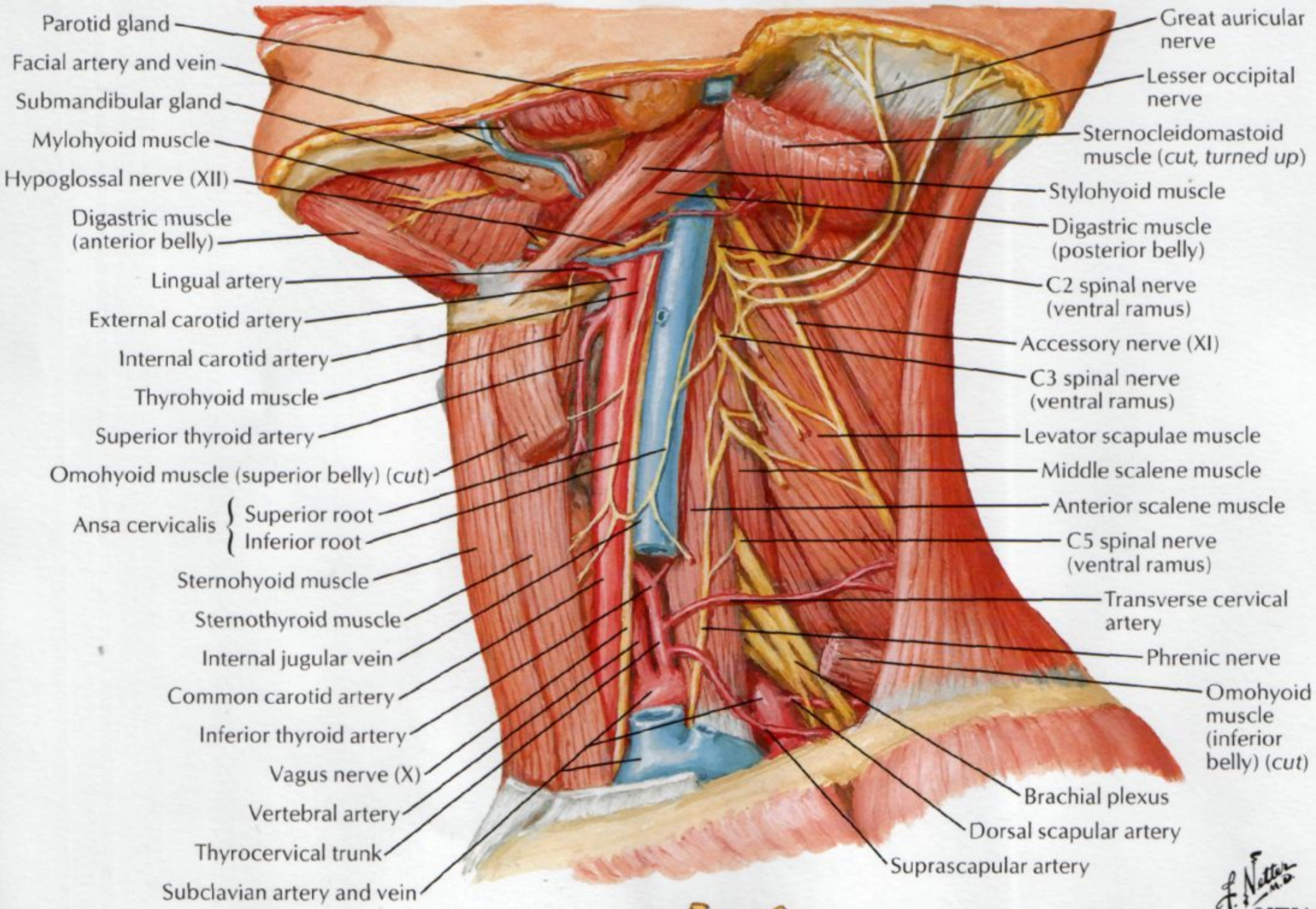
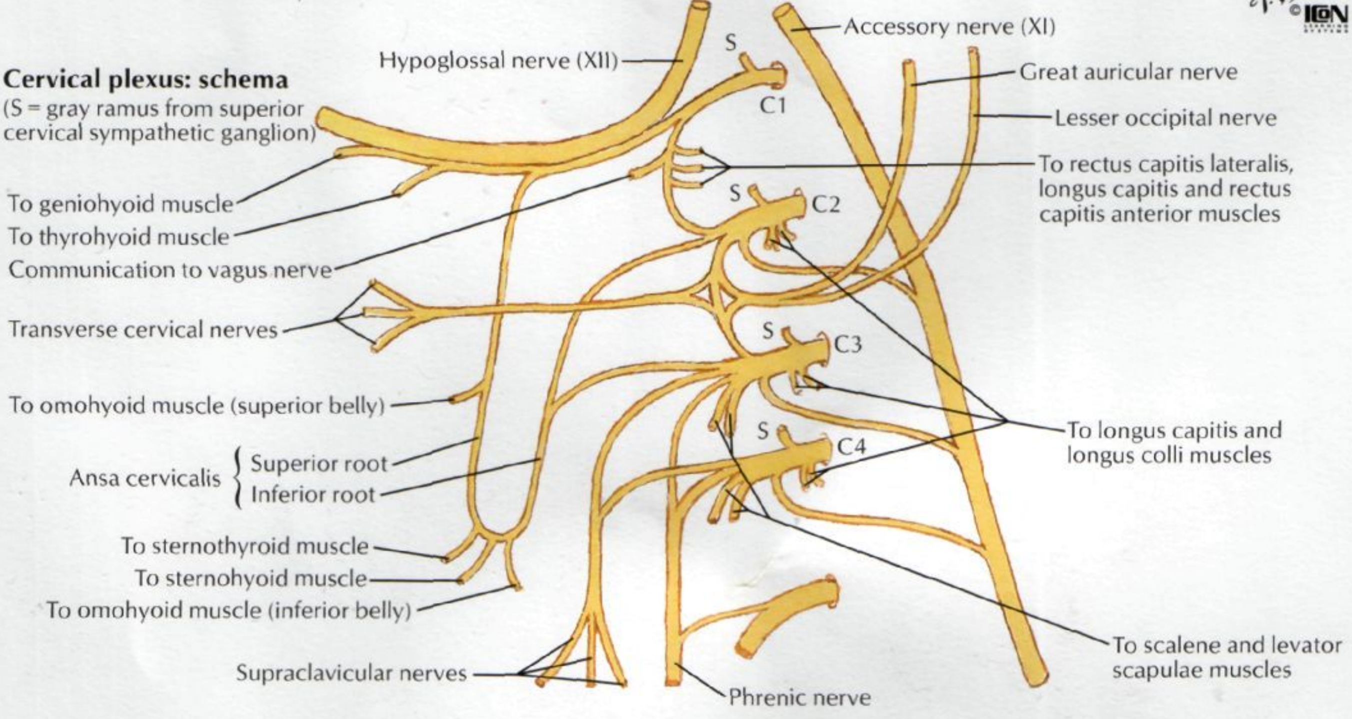
Cervical Plexus In Situ

SEE ALSO PLATES 121–123, 190



Cervical plexus: schema

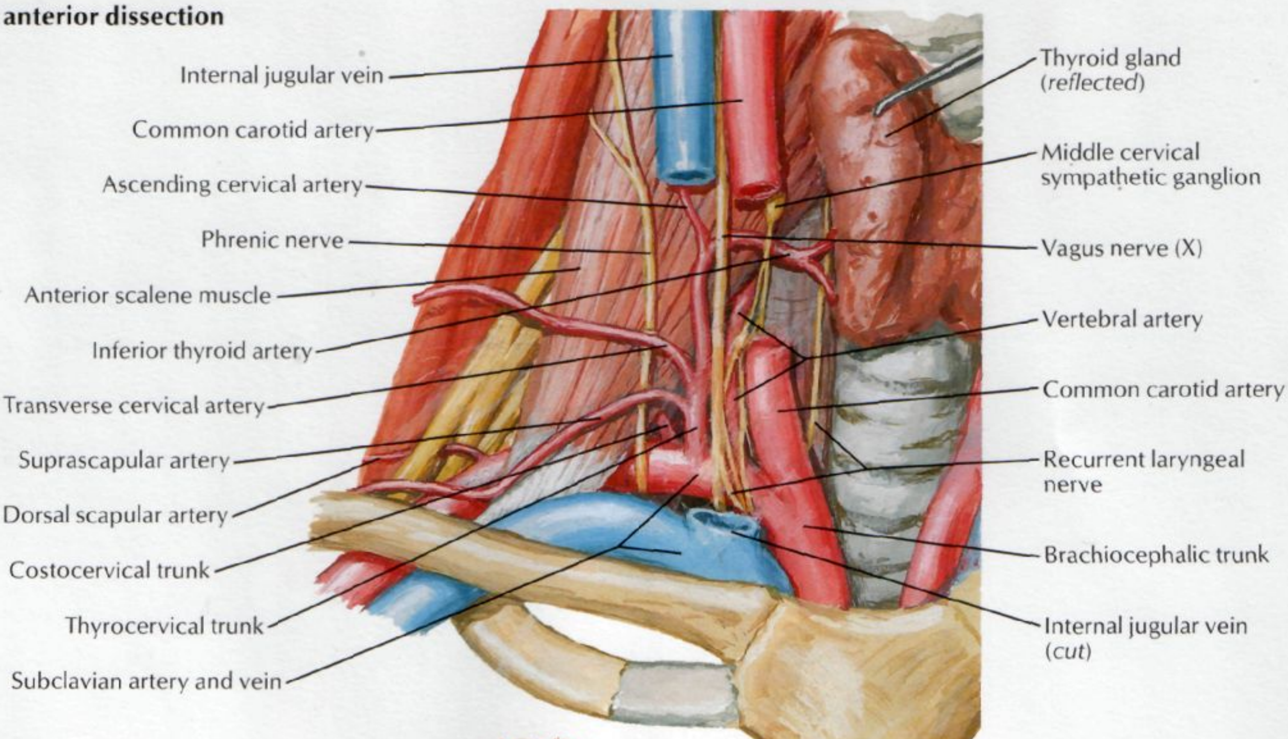
(S = gray ramus from superior cervical sympathetic ganglion)


Hypoglossal nerve (XII)
S
C1
Accessory nerve (XI)
Great auricular nerve
Lesser occipital nerve
To rectus capitis lateralis, longus capitis and rectus capitis anterior muscles
To geniohyoid muscle
To thyrohyoid muscle
Communication to vagus nerve
S
C2
Transverse cervical nerves
S
C3
To omohyoid muscle (superior belly)
S
C4
To longus capitis and longus colli muscles
Ansa cervicalis { Superior root
Inferior root
To sternothyroid muscle
To sternohyoid muscle
To omohyoid muscle (inferior belly)
To scalene and levator scapulae muscles
Supraclavicular nerves
Phrenic nerve

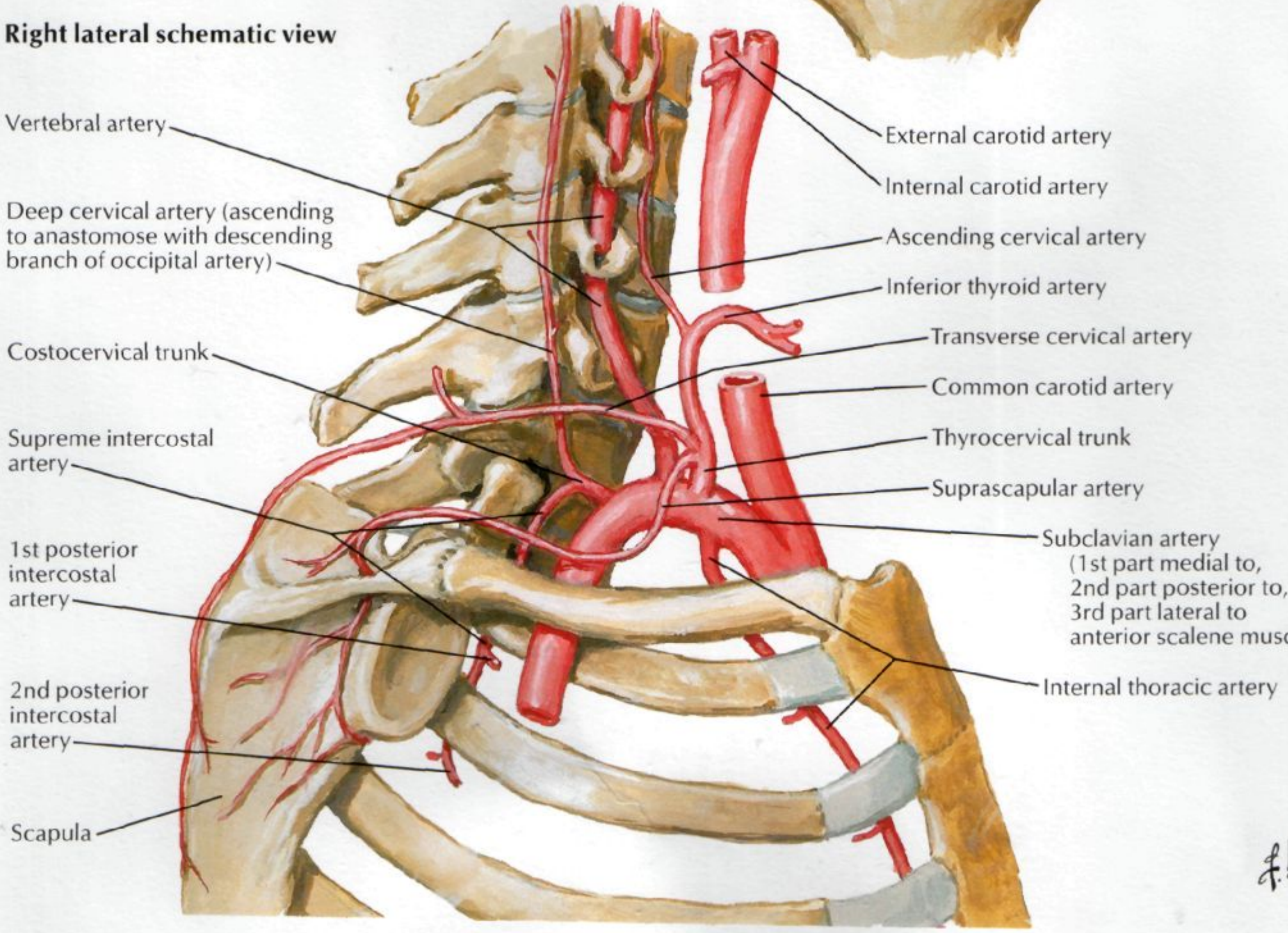
Subclavian Artery

SEE ALSO PLATE 410

Right anterior dissection



Right lateral schematic view


Vertebral artery
Deep cervical artery (ascending to anastomose with descending branch of occipital artery)
Costocervical trunk
Supreme intercostal artery
1st posterior intercostal artery
2nd posterior intercostal artery
Scapula
External carotid artery
Internal carotid artery
Ascending cervical artery
Inferior thyroid artery
Transverse cervical artery
Common carotid artery
Thyrocervical trunk
Suprascapular artery
Subclavian artery (1st part medial to, 2nd part posterior to, 3rd part lateral to anterior scalene muscle)
Internal thoracic artery

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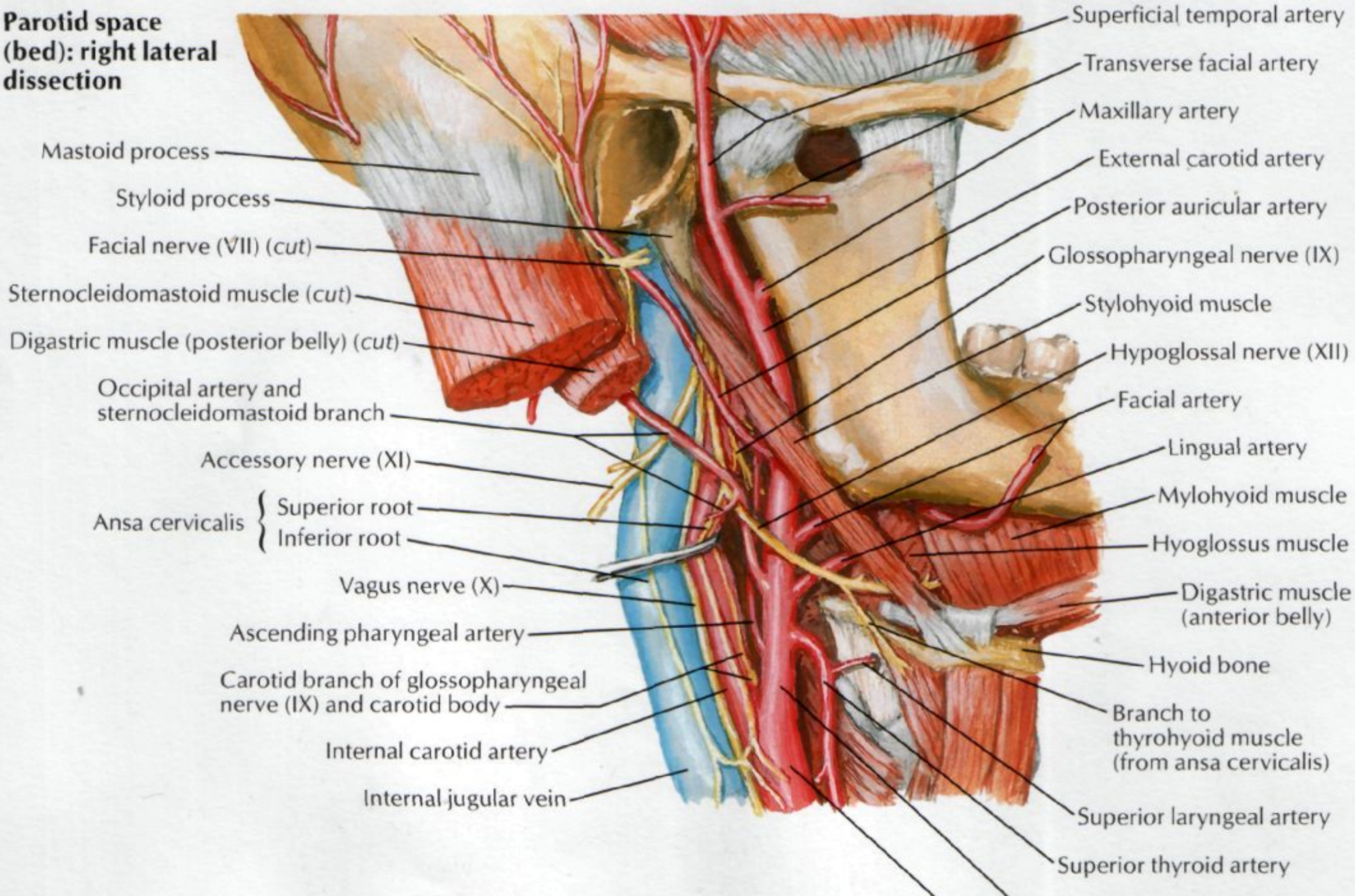
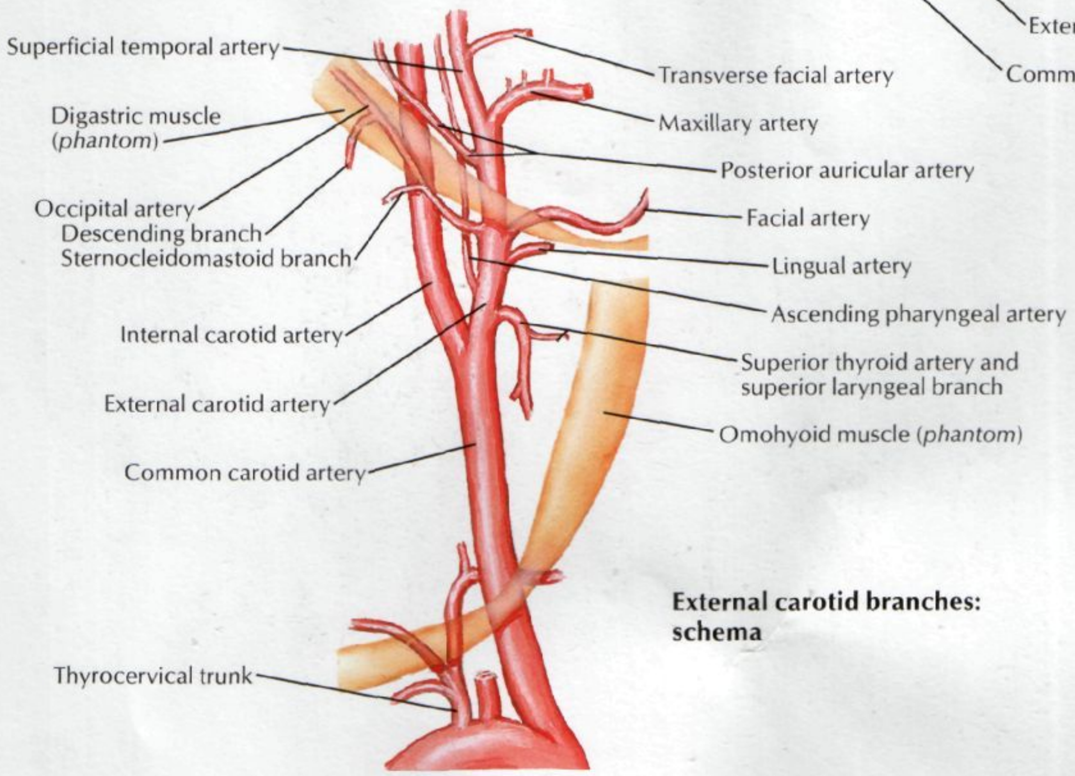
Carotid Arteries

SEE ALSO PLATES 130, 131



Parotid space (bed): right lateral dissection

Mastoid process
Styloid process
Facial nerve (VII) (*cut*)
Sternocleidomastoid muscle (*cut*)
Digastric muscle (posterior belly) (*cut*)
Occipital artery and sternocleidomastoid branch
Accessory nerve (XI)
Ansa cervicalis
Superior root
Inferior root
Vagus nerve (X)
Ascending pharyngeal artery
Carotid branch of glossopharyngeal nerve (IX) and carotid body
Internal carotid artery
Internal jugular vein
Superficial temporal artery
Transverse facial artery
Maxillary artery
External carotid artery
Posterior auricular artery
Glossopharyngeal nerve (IX)
Stylohyoid muscle
Hypoglossal nerve (XII)
Facial artery
Lingual artery
Mylohyoid muscle
Hyoglossus muscle
Digastric muscle (anterior belly)
Hyoid bone
Branch to thyrohyoid muscle (from ansa cervicalis)
Superior laryngeal artery
Superior thyroid artery
External carotid artery
Common carotid artery



External carotid branches: schema

Superficial temporal artery
Digastric muscle (*phantom*)
Occipital artery
Descending branch
Sternocleidomastoid branch
Internal carotid artery
External carotid artery
Common carotid artery
Thyrocervical trunk
Transverse facial artery
Maxillary artery
Posterior auricular artery
Facial artery
Lingual artery
Ascending pharyngeal artery
Superior thyroid artery and superior laryngeal branch
Omohyoid muscle (*phantom*)

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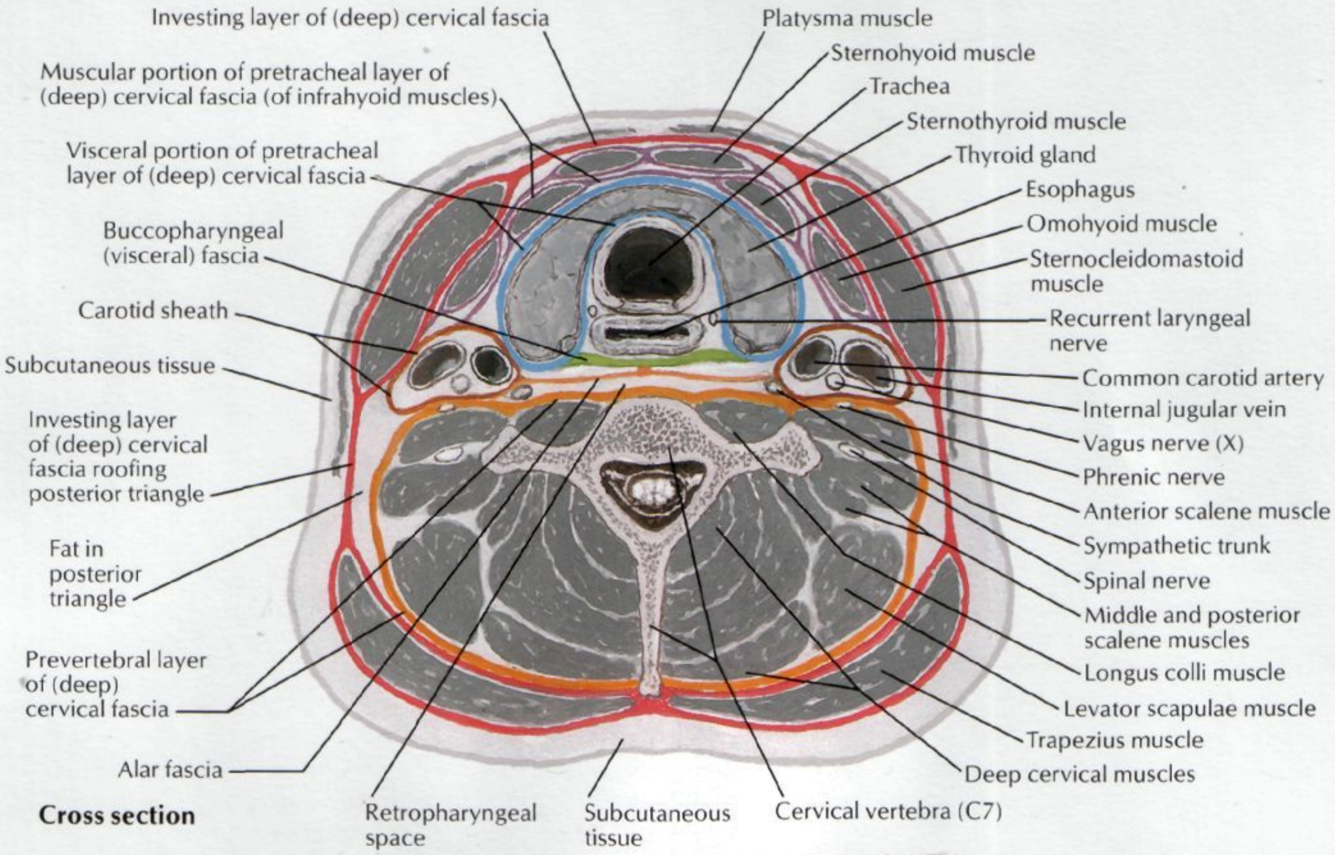
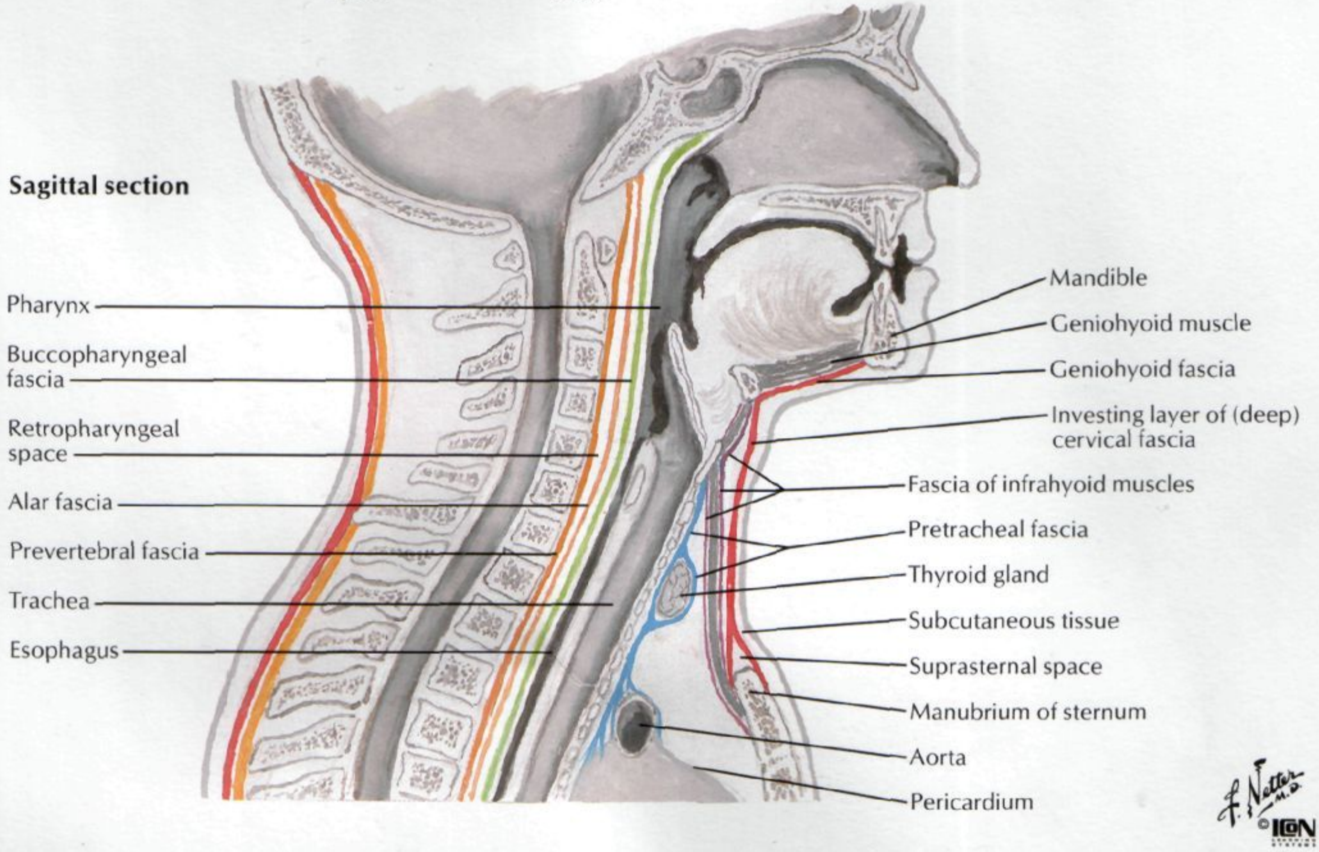
Fascial Layers of Neck

FOR CONTENTS OF CAROTID SHEATH SEE PLATES 65–67


Investing layer of (deep) cervical fascia
Muscular portion of pretracheal layer of (deep) cervical fascia (of infrahyoid muscles)
Visceral portion of pretracheal layer of (deep) cervical fascia
Buccopharyngeal (visceral) fascia
Carotid sheath
Subcutaneous tissue
Investing layer of (deep) cervical fascia roofing posterior triangle
Fat in posterior triangle
Prevertebral layer of (deep) cervical fascia
Alar fascia
Retropharyngeal space
Subcutaneous tissue
Cervical vertebra (C7)
Platysma muscle
Sternohyoid muscle
Trachea
Sternothyroid muscle
Thyroid gland
Esophagus
Omohyoid muscle
Sternocleidomastoid muscle
Recurrent laryngeal nerve
Common carotid artery
Internal jugular vein
Vagus nerve (X)
Phrenic nerve
Anterior scalene muscle
Sympathetic trunk
Spinal nerve
Middle and posterior scalene muscles
Longus colli muscle
Levator scapulae muscle
Trapezius muscle
Deep cervical muscles

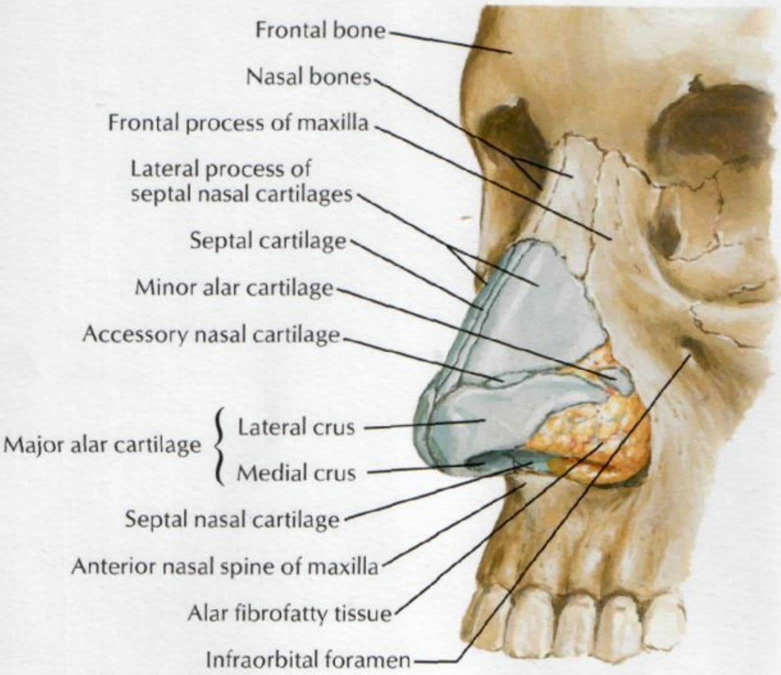
Cross section



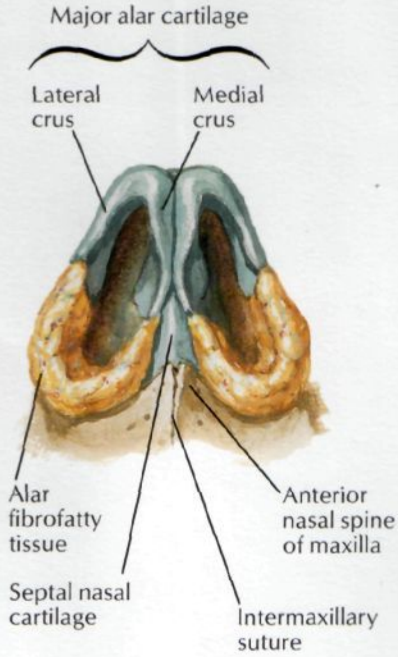
Sagittal section

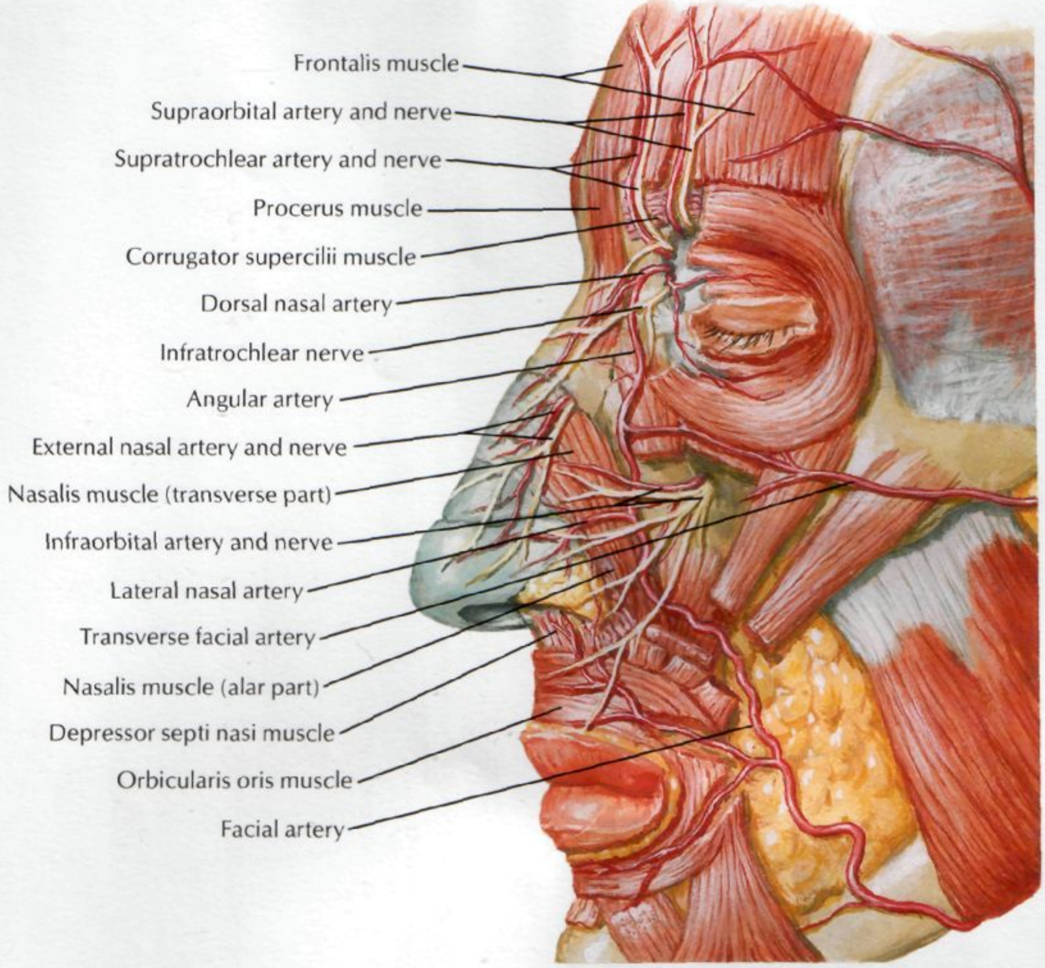
Nose

Anterolateral view



Inferior view





Frontalis muscle
Supraorbital artery and nerve
Supratrochlear artery and nerve
Procerus muscle
Corrugator supercilii muscle
Dorsal nasal artery
Infratrochlear nerve
Angular artery
External nasal artery and nerve
Nasalis muscle (transverse part)
Infraorbital artery and nerve
Lateral nasal artery
Transverse facial artery
Nasalis muscle (alar part)
Depressor septi nasi muscle
Orbicularis oris muscle
Facial artery

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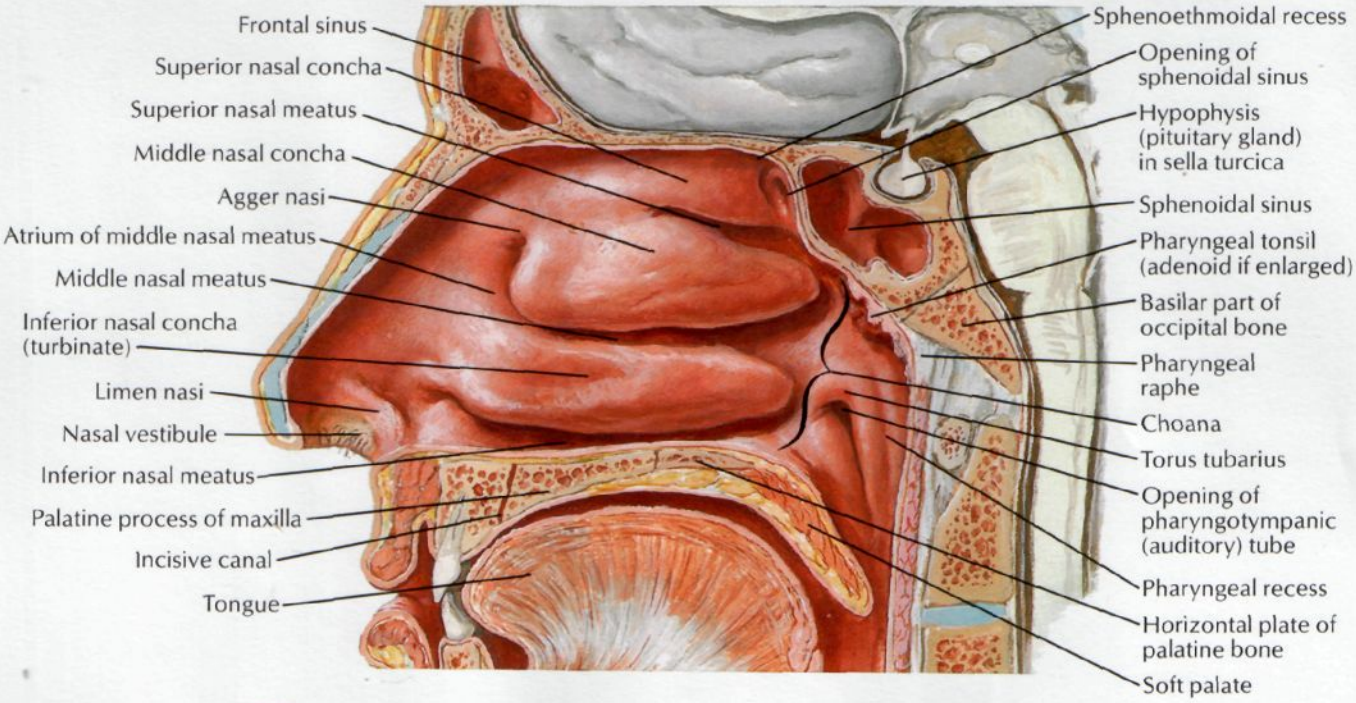
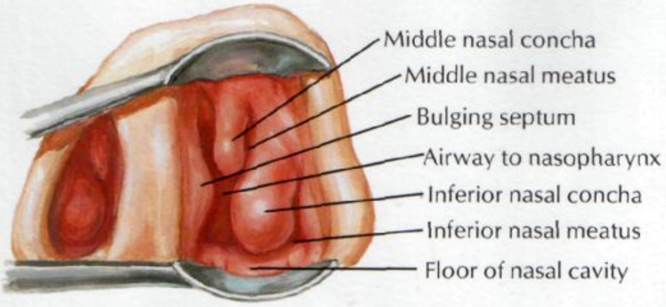
Lateral Wall of Nasal Cavity


Frontal sinus
Superior nasal concha
Superior nasal meatus
Middle nasal concha
Agger nasi
Atrium of middle nasal meatus
Middle nasal meatus
Inferior nasal concha (turbinate)
Limen nasi
Nasal vestibule
Inferior nasal meatus
Palatine process of maxilla
Incisive canal
Tongue
Sphenoethmoidal recess
Opening of sphenoidal sinus
Hypophysis (pituitary gland) in sella turcica
Sphenoidal sinus
Pharyngeal tonsil (adenoid if enlarged)
Basilar part of occipital bone
Pharyngeal raphe
Choana
Torus tubarius
Opening of pharyngotympanic (auditory) tube
Pharyngeal recess
Horizontal plate of palatine bone
Soft palate



Speculum view

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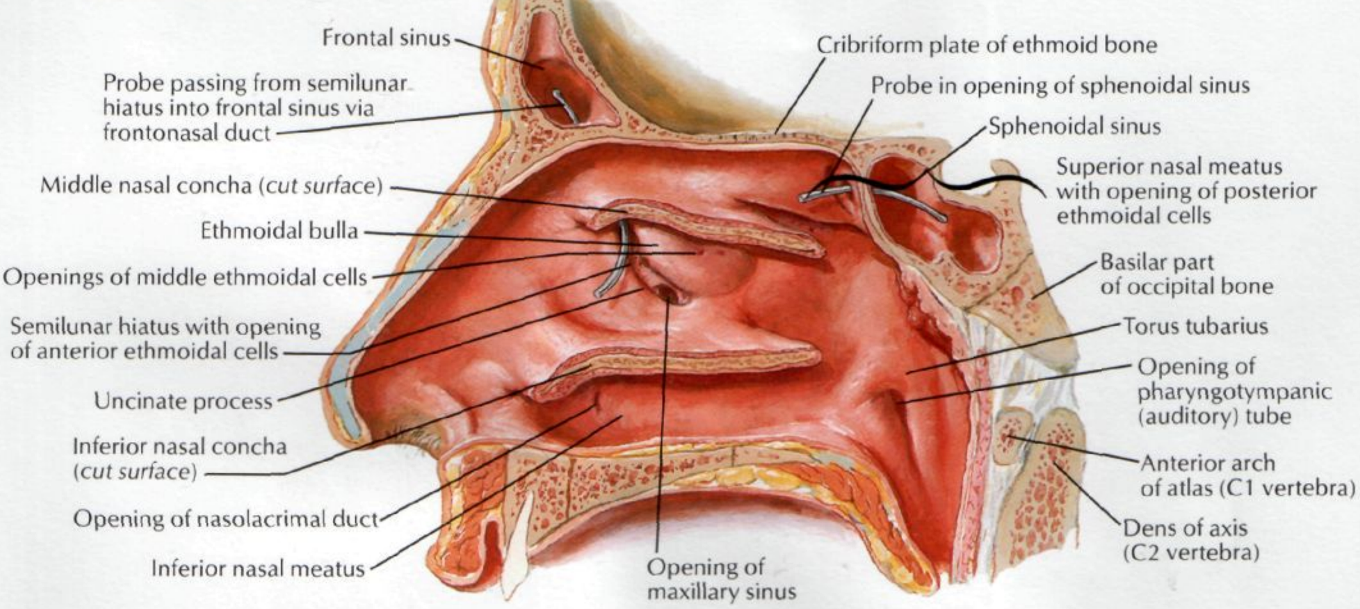
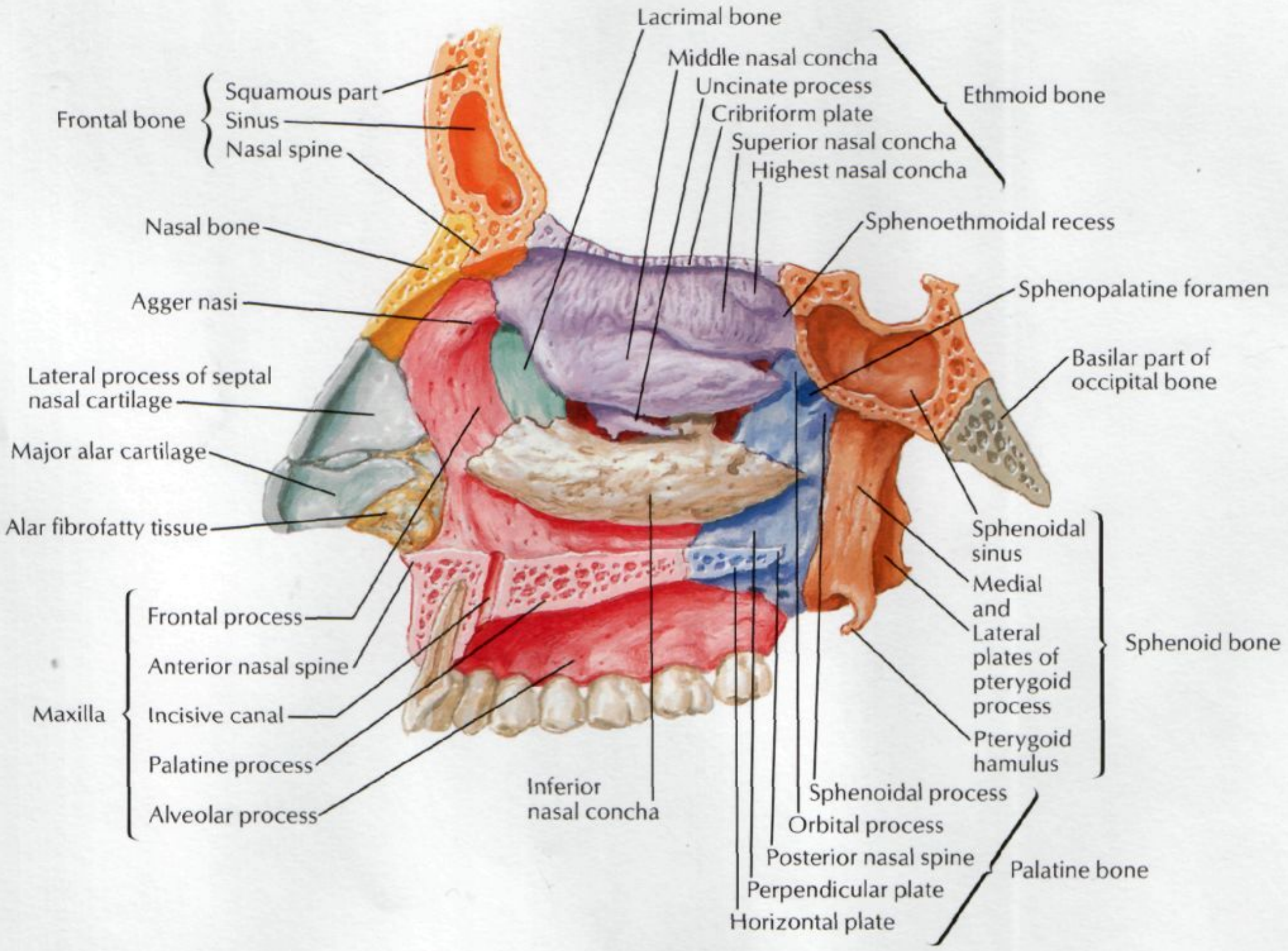
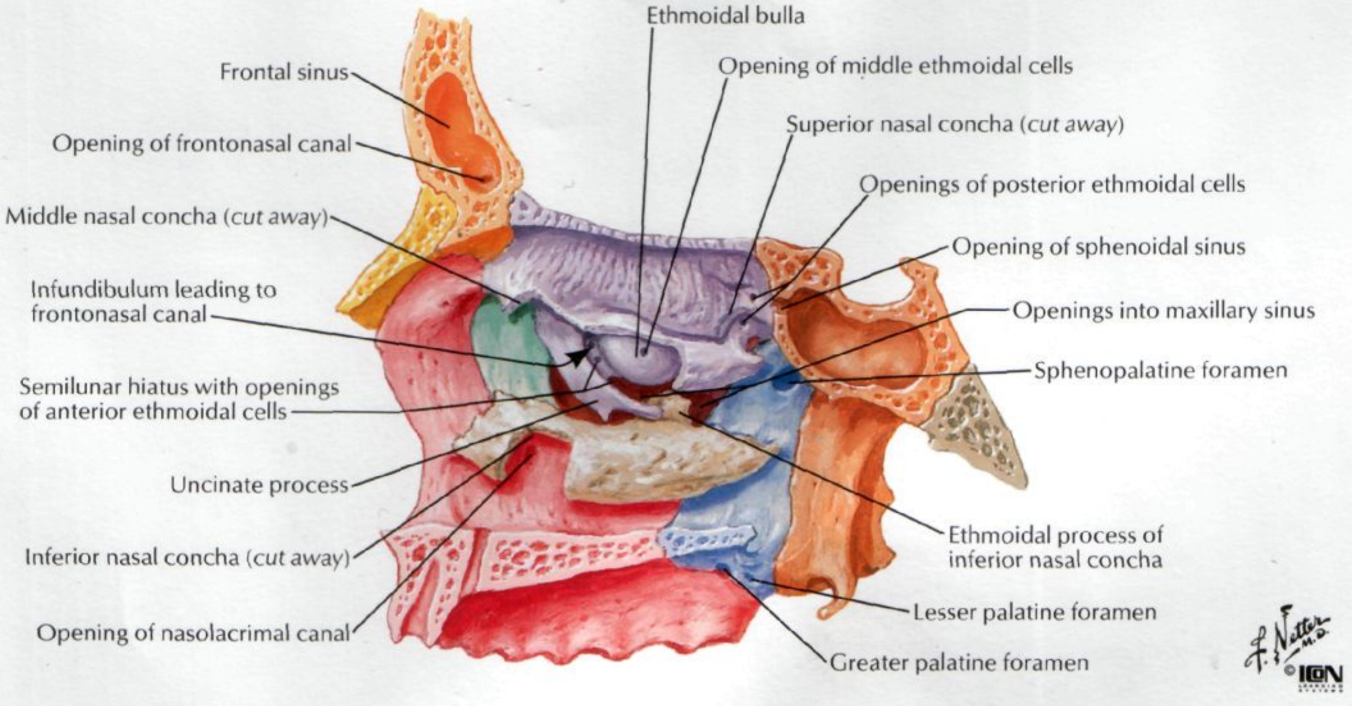

Frontal sinus
Probe passing from semilunar hiatus into frontal sinus via frontonasal duct
Middle nasal concha (*cut surface*)
Ethmoidal bulla
Openings of middle ethmoidal cells
Semilunar hiatus with opening of anterior ethmoidal cells
Uncinate process
Inferior nasal concha (*cut surface*)
Opening of nasolacrimal duct
Inferior nasal meatus
Opening of maxillary sinus
Cribriform plate of ethmoid bone
Probe in opening of sphenoidal sinus
Sphenoidal sinus
Superior nasal meatus with opening of posterior ethmoidal cells
Basilar part of occipital bone
Torus tubarius
Opening of pharyngotympanic (auditory) tube
Anterior arch of atlas (C1 vertebra)
Dens of axis (C2 vertebra)

Lateral Wall of Nasal Cavity (continued)

SEE ALSO PLATE 6




Ethmoidal bulla
Opening of middle ethmoidal cells
Frontal sinus
Superior nasal concha (cut away)
Opening of frontonasal canal
Openings of posterior ethmoidal cells
Middle nasal concha (cut away)
Opening of sphenoidal sinus
Infundibulum leading to frontonasal canal
Openings into maxillary sinus
Sphenopalatine foramen
Semilunar hiatus with openings of anterior ethmoidal cells
Uncinate process
Ethmoidal process of inferior nasal concha
Inferior nasal concha (cut away)
Lesser palatine foramen
Opening of nasolacrimal canal
Greater palatine foramen
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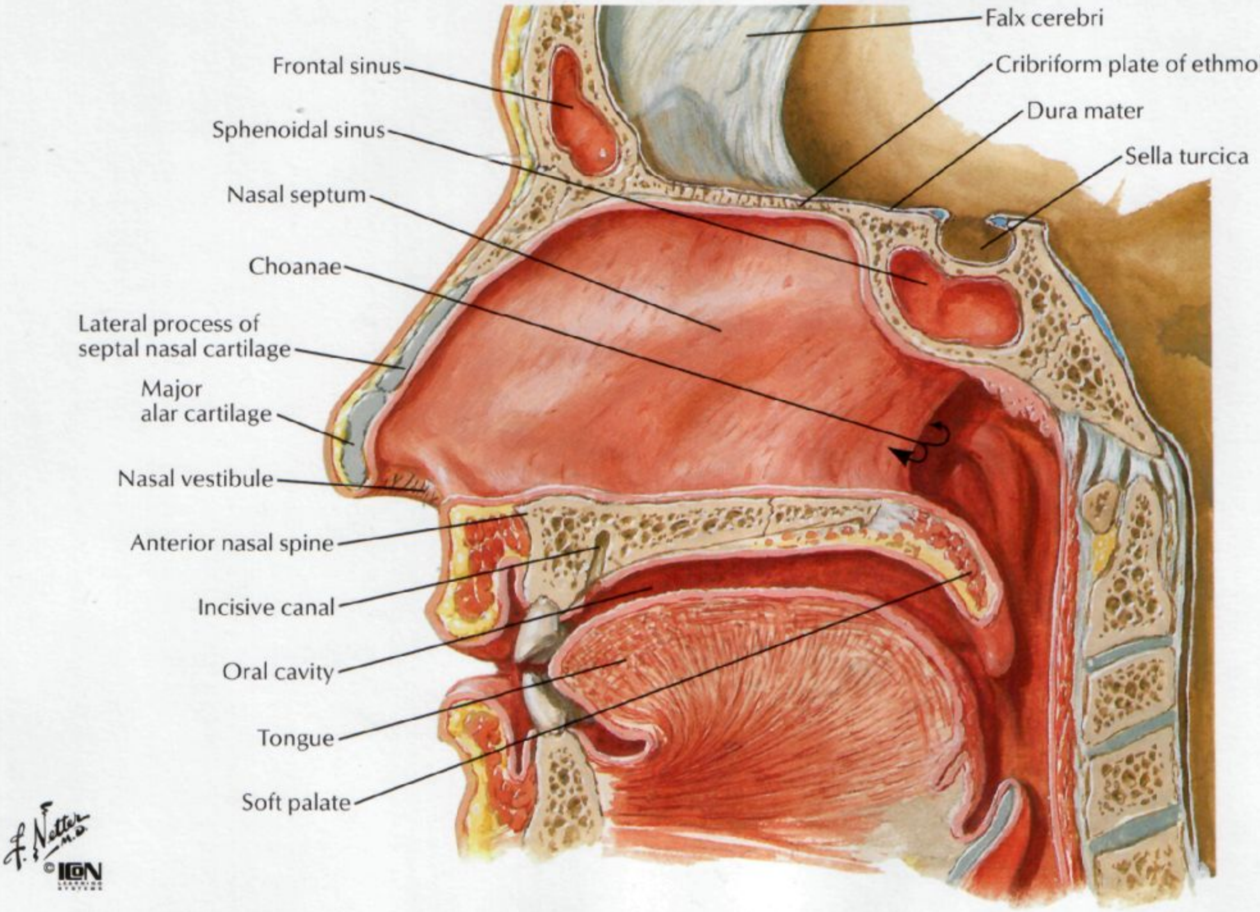
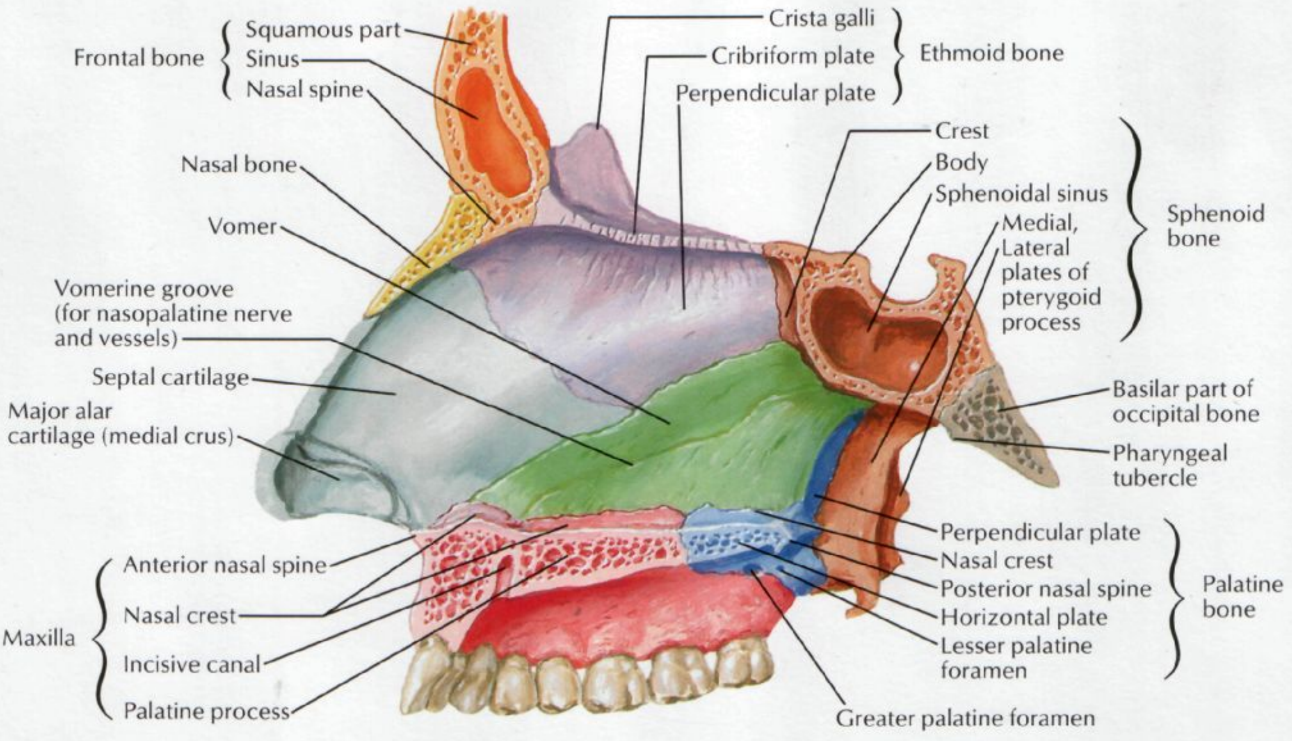
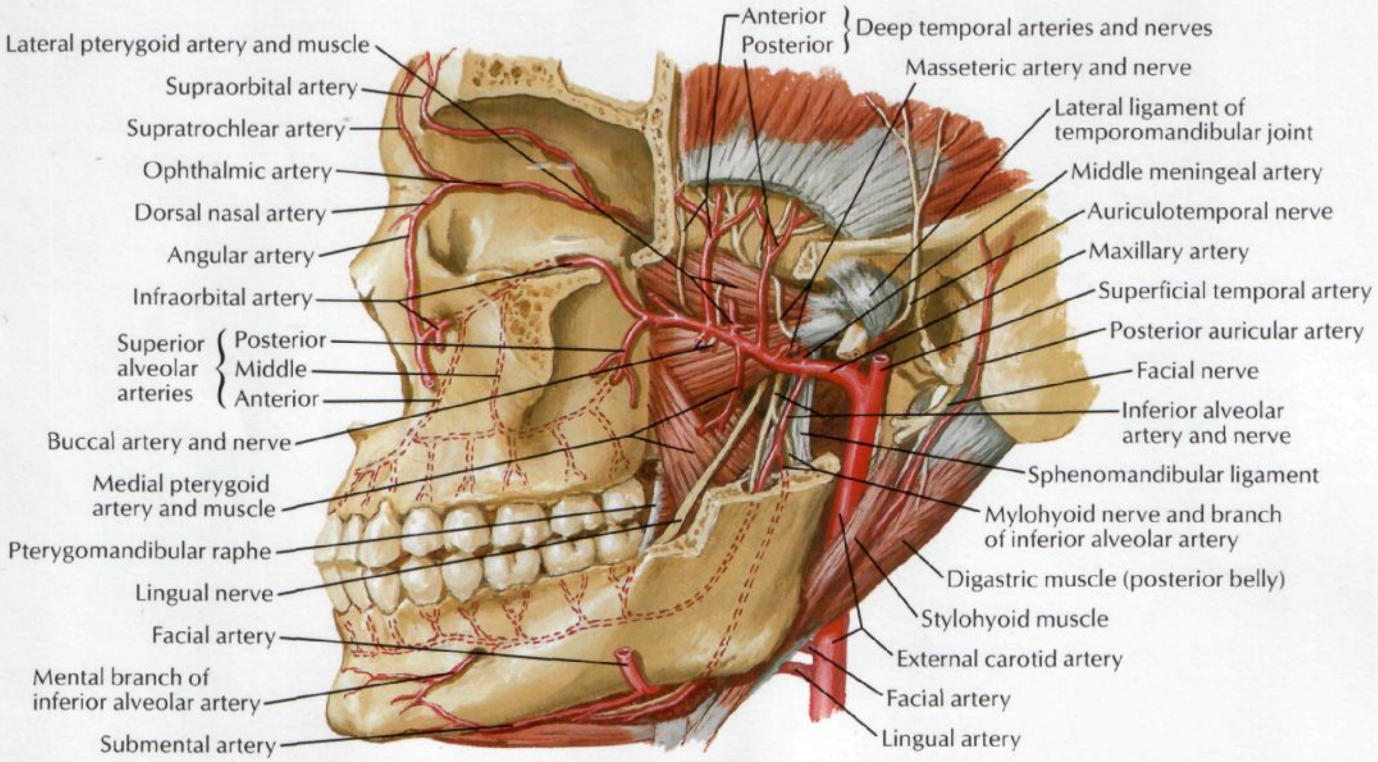
Medial Wall of Nasal Cavity (Nasal Septum)

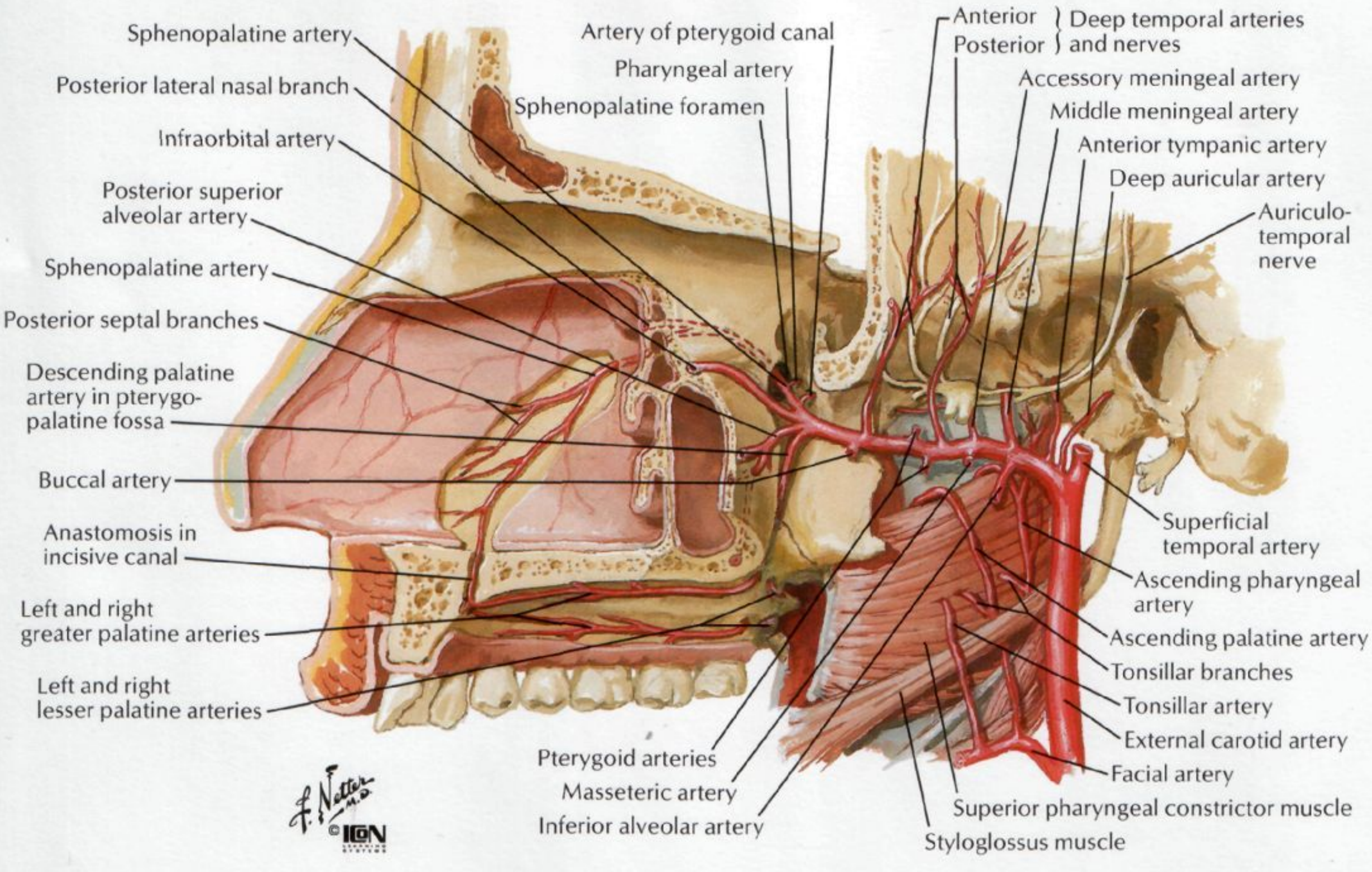




Maxillary Artery

SEE ALSO PLATE 30


Lateral pterygoid artery and muscle
Supraorbital artery
Supratrochlear artery
Ophthalmic artery
Dorsal nasal artery
Angular artery
Infraorbital artery
Superior alveolar arteries
Posterior
Middle
Anterior
Buccal artery and nerve
Medial pterygoid artery and muscle
Pterygomandibular raphe
Lingual nerve
Facial artery
Mental branch of inferior alveolar artery
Submental artery
Anterior
Posterior
Deep temporal arteries and nerves
Masseteric artery and nerve
Lateral ligament of temporomandibular joint
Middle meningeal artery
Auriculotemporal nerve
Maxillary artery
Superficial temporal artery
Posterior auricular artery
Facial nerve
Inferior alveolar artery and nerve
Sphenomandibular ligament
Mylohyoid nerve and branch of inferior alveolar artery
Digastric muscle (posterior belly)
Stylohyoid muscle
External carotid artery
Facial artery
Lingual artery


Sphenopalatine artery
Posterior lateral nasal branch
Infraorbital artery
Posterior superior alveolar artery
Sphenopalatine artery
Posterior septal branches
Descending palatine artery in pterygopalatine fossa
Buccal artery
Anastomosis in incisive canal
Left and right greater palatine arteries
Left and right lesser palatine arteries
Artery of pterygoid canal
Pharyngeal artery
Sphenopalatine foramen
Pterygoid arteries
Masseteric artery
Inferior alveolar artery
Anterior
Posterior
Deep temporal arteries and nerves
Accessory meningeal artery
Middle meningeal artery
Anterior tympanic artery
Deep auricular artery
Auriculotemporal nerve
Superficial temporal artery
Ascending pharyngeal artery
Ascending palatine artery
Tonsillar branches
Tonsillar artery
External carotid artery
Facial artery
Superior pharyngeal constrictor muscle
Styloglossus muscle
F. Netter M.D.
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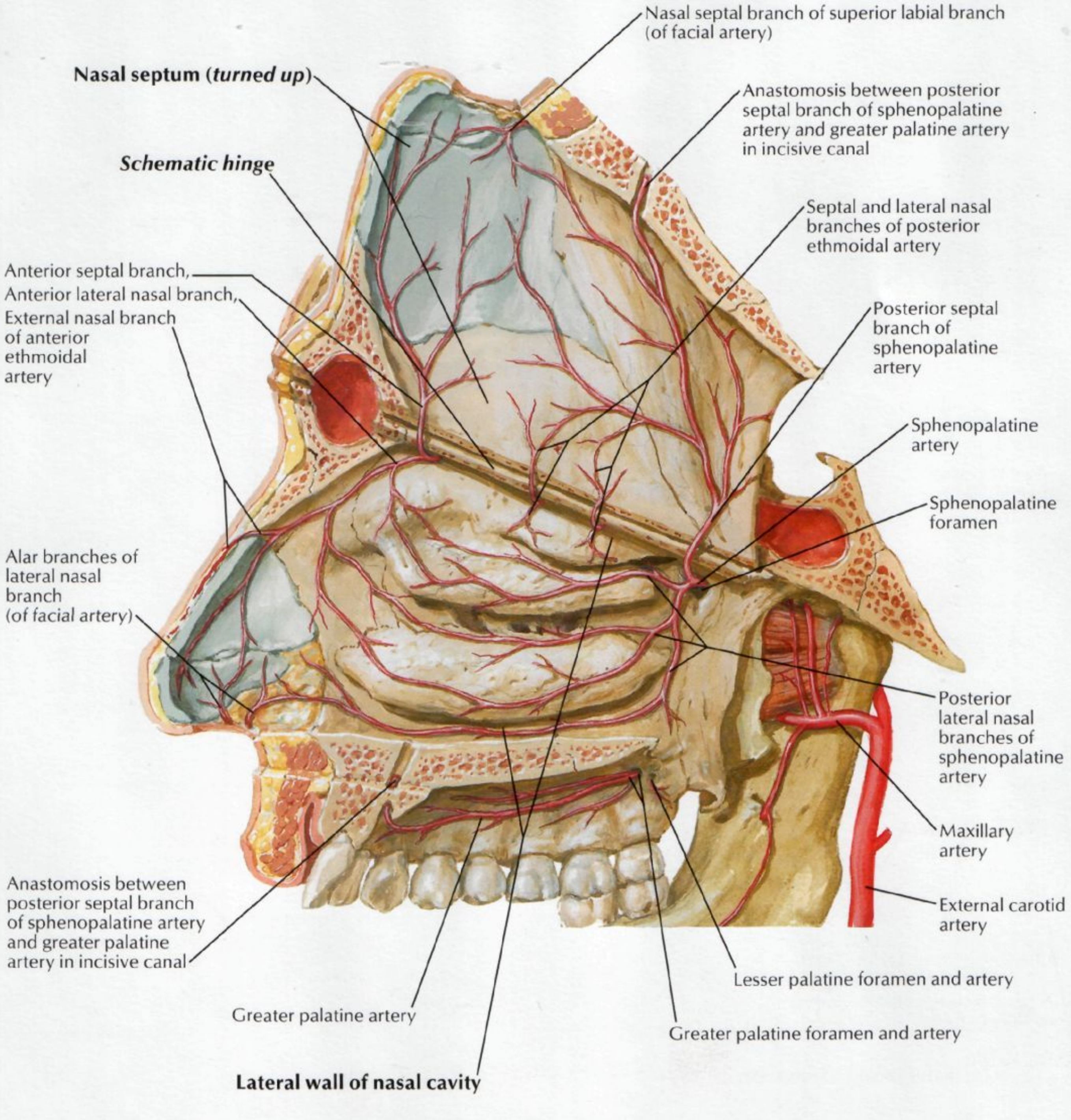
Arteries of Nasal Cavity: Nasal Septum Turned Up


Nasal septal branch of superior labial branch (of facial artery)
Nasal septum (*turned up*)
Anastomosis between posterior septal branch of sphenopalatine artery and greater palatine artery in incisive canal
Schematic hinge
Septal and lateral nasal branches of posterior ethmoidal artery
Anterior septal branch,
Anterior lateral nasal branch,
External nasal branch of anterior ethmoidal artery
Posterior septal branch of sphenopalatine artery
Sphenopalatine artery
Sphenopalatine foramen
Alar branches of lateral nasal branch (of facial artery)
Posterior lateral nasal branches of sphenopalatine artery
Maxillary artery
Anastomosis between posterior septal branch of sphenopalatine artery and greater palatine artery in incisive canal
External carotid artery
Lesser palatine foramen and artery
Greater palatine artery
Greater palatine foramen and artery
Lateral wall of nasal cavity

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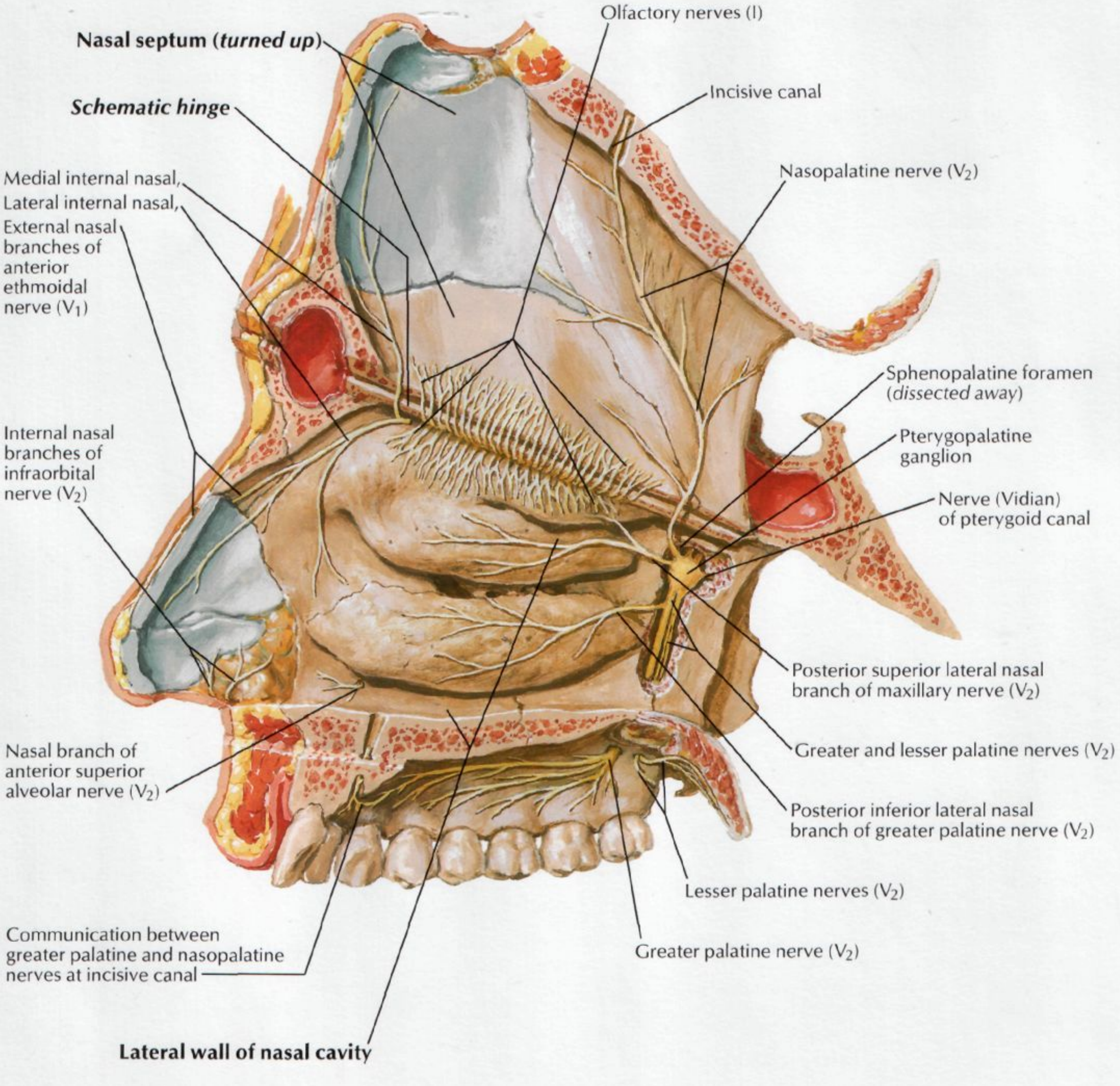
Nerves of Nasal Cavity: Nasal Septum Turned Up

SEE ALSO PLATES 40, 41, 113


Nasal septum (*turned up*)
Schematic hinge
Medial internal nasal,
Lateral internal nasal,
External nasal branches of anterior ethmoidal nerve (V_1)
Internal nasal branches of infraorbital nerve (V_2)
Nasal branch of anterior superior alveolar nerve (V_2)
Communication between greater palatine and nasopalatine nerves at incisive canal
Lateral wall of nasal cavity
Olfactory nerves (I)
Incisive canal
Nasopalatine nerve (V_2)
Sphenopalatine foramen (*dissected away*)
Pterygopalatine ganglion
Nerve (Vidian) of pterygoid canal
Posterior superior lateral nasal branch of maxillary nerve (V_2)
Greater and lesser palatine nerves (V_2)
Posterior inferior lateral nasal branch of greater palatine nerve (V_2)
Lesser palatine nerves (V_2)
Greater palatine nerve (V_2)

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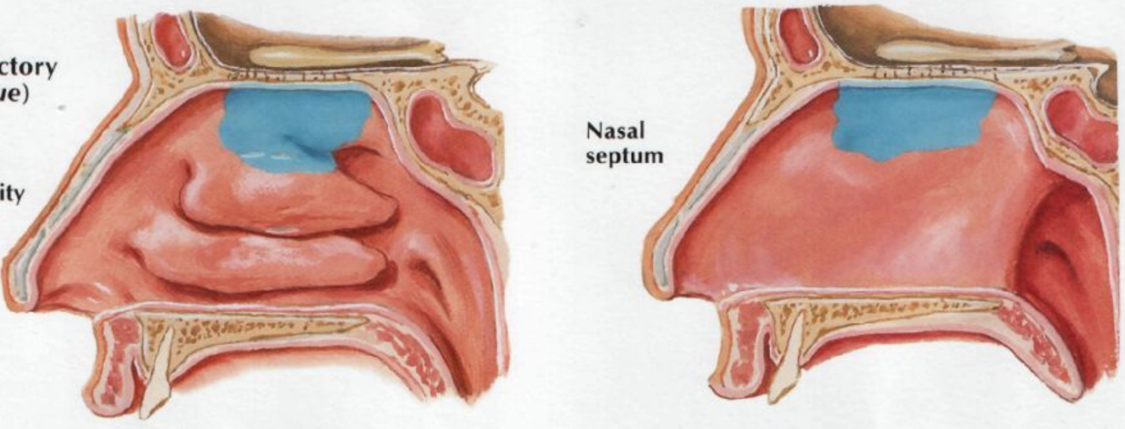
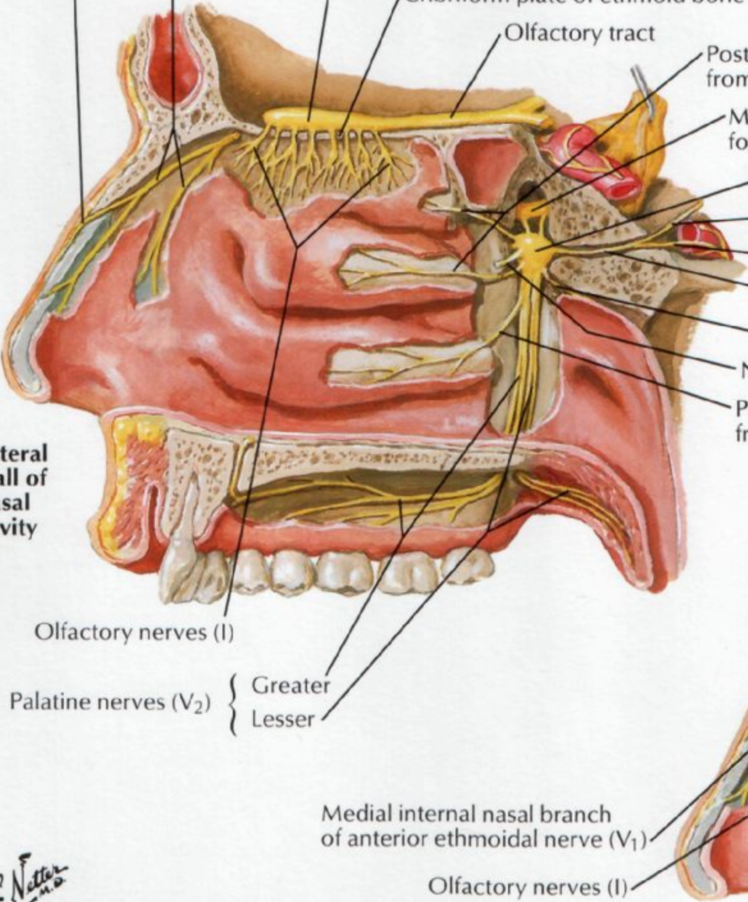
Nerves of Nasal Cavity (continued)

SEE ALSO PLATE 113

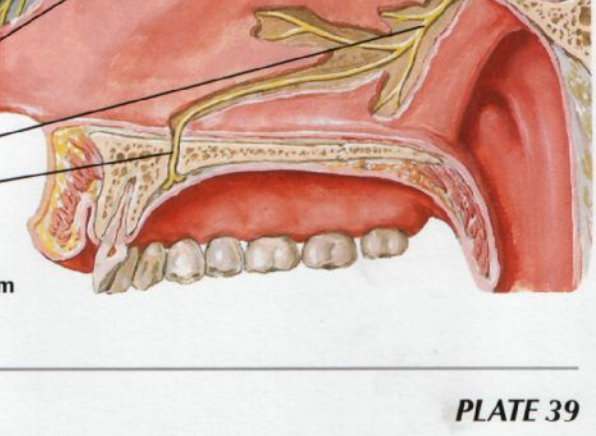
Distribution of olfactory mucosa (*shaded blue*)


Lateral wall of nasal cavity

Nasal septum


External nasal branch of anterior ethmoidal nerve (V_1)
Lateral internal nasal branch of anterior ethmoidal nerve (V_1)
Olfactory bulb
Cribriform plate of ethmoid bone
Olfactory tract
Posterior superior lateral nasal branches from maxillary nerve (V_2)
Maxillary nerve (V_2) (sphenopalatine foramen dissected away)
Pterygopalatine ganglion
Greater petrosal nerve
Deep petrosal nerve
Nerve (Vidian) of pterygoid canal
Pharyngeal branch of maxillary nerve (V_2)
Nasopalatine nerve (V_2) passing to septum (*cut*)
Posterior inferior lateral nasal branch from greater palatine nerve (V_2)
Olfactory nerves (I)
Palatine nerves (V_2) { Greater
Lesser

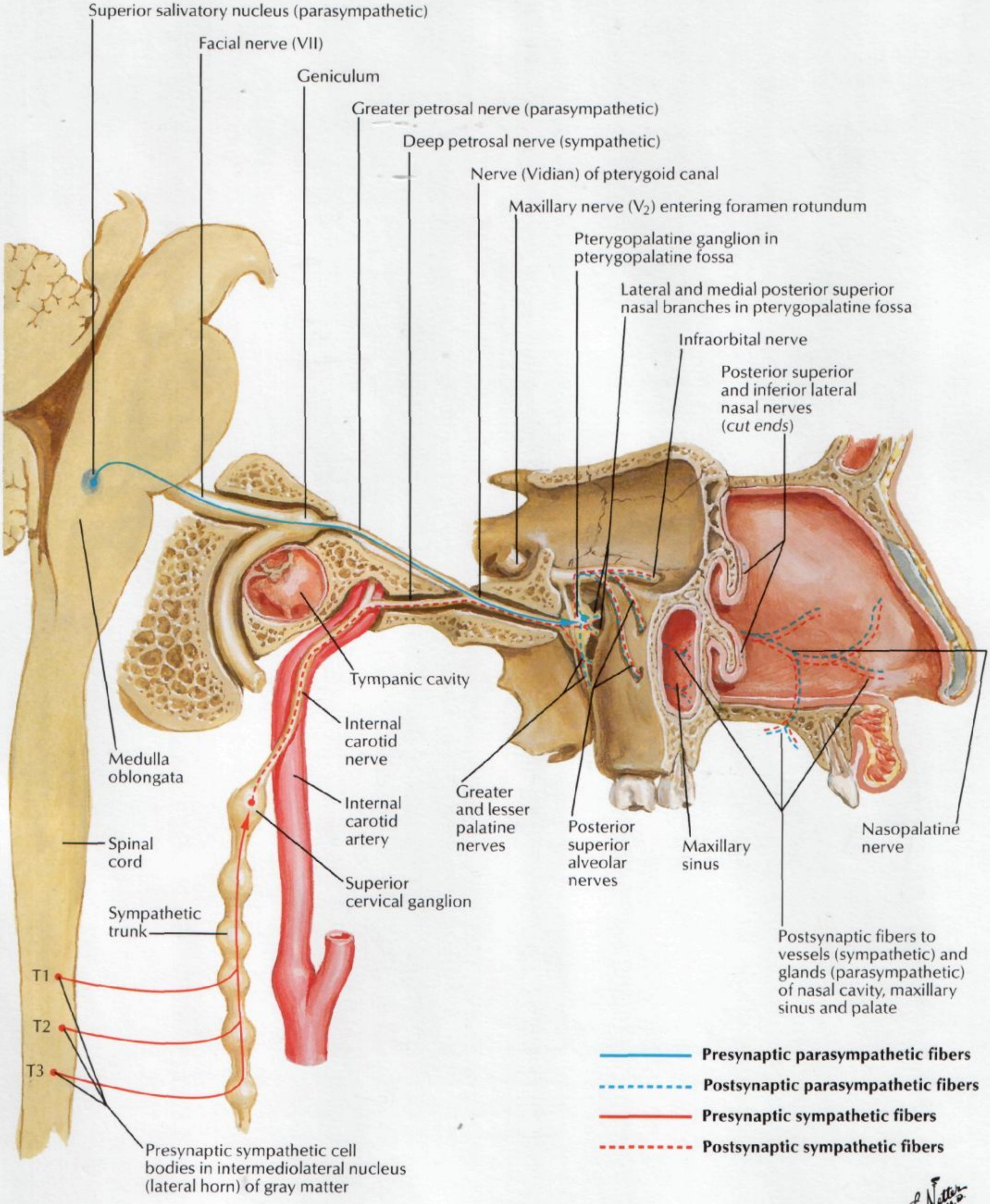
Lateral wall of nasal cavity


Olfactory bulb
Cribriform plate
Olfactory tract
Medial internal nasal branch of anterior ethmoidal nerve (V_1)
Olfactory nerves (I)
Nasopalatine nerve (V_2)
Incisive canal

Nasal septum

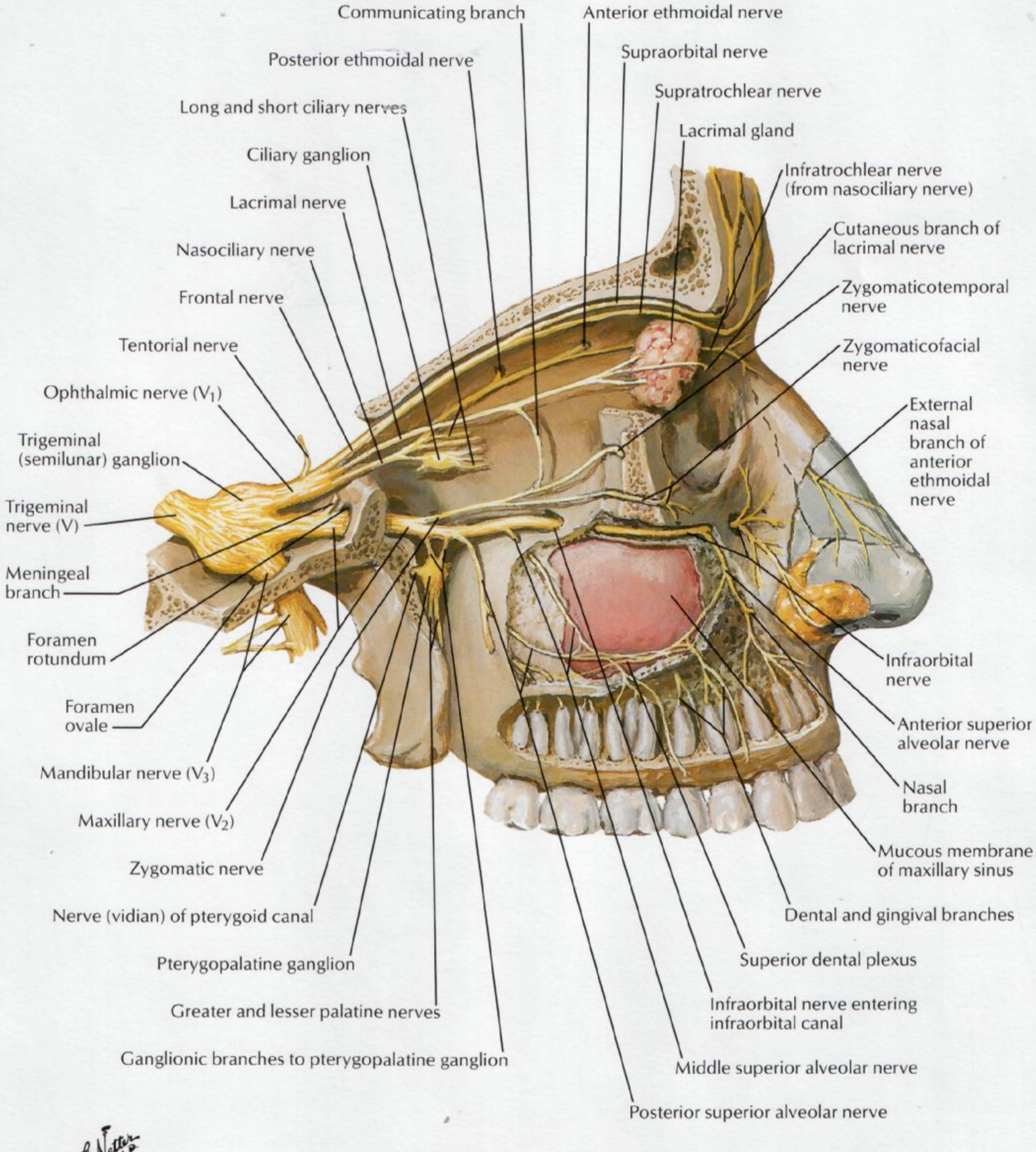
Autonomic Innervation of Nasal Cavity

SEE ALSO PLATES 116, 125, 127


Superior salivatory nucleus (parasympathetic)
Facial nerve (VII)
Geniculum
Greater petrosal nerve (parasympathetic)
Deep petrosal nerve (sympathetic)
Nerve (Vidian) of pterygoid canal
Maxillary nerve (V_2) entering foramen rotundum
Pterygopalatine ganglion in pterygopalatine fossa
Lateral and medial posterior superior nasal branches in pterygopalatine fossa
Infraorbital nerve
Posterior superior and inferior lateral nasal nerves (*cut ends*)
Tympanic cavity
Internal carotid nerve
Internal carotid artery
Superior cervical ganglion
Medulla oblongata
Spinal cord
Sympathetic trunk
T1
T2
T3
Presynaptic sympathetic cell bodies in intermediolateral nucleus (lateral horn) of gray matter
Greater and lesser palatine nerves
Posterior superior alveolar nerves
Maxillary sinus
Nasopalatine nerve
Postsynaptic fibers to vessels (sympathetic) and glands (parasympathetic) of nasal cavity, maxillary sinus and palate
━━━ **Presynaptic parasympathetic fibers**
- - - - **Postsynaptic parasympathetic fibers**
━━━ **Presynaptic sympathetic fibers**
- - - - **Postsynaptic sympathetic fibers**

Ophthalmic (V_1) and Maxillary (V_2) Nerves

SEE ALSO PLATE 116


Communicating branch
Anterior ethmoidal nerve
Posterior ethmoidal nerve
Supraorbital nerve
Supratrochlear nerve
Long and short ciliary nerves
Lacrimal gland
Ciliary ganglion
Infratrochlear nerve (from nasociliary nerve)
Lacrimal nerve
Cutaneous branch of lacrimal nerve
Nasociliary nerve
Zygomaticotemporal nerve
Frontal nerve
Tentorial nerve
Zygomaticofacial nerve
Ophthalmic nerve (V_1)
External nasal branch of anterior ethmoidal nerve
Trigeminal (semilunar) ganglion
Trigeminal nerve (V)
Meningeal branch
Foramen rotundum
Infraorbital nerve
Foramen ovale
Anterior superior alveolar nerve
Mandibular nerve (V_3)
Nasal branch
Maxillary nerve (V_2)
Mucous membrane of maxillary sinus
Zygomatic nerve
Dental and gingival branches
Nerve (vidian) of pterygoid canal
Superior dental plexus
Pterygopalatine ganglion
Infraorbital nerve entering infraorbital canal
Greater and lesser palatine nerves
Ganglionic branches to pterygopalatine ganglion
Middle superior alveolar nerve
Posterior superior alveolar nerve

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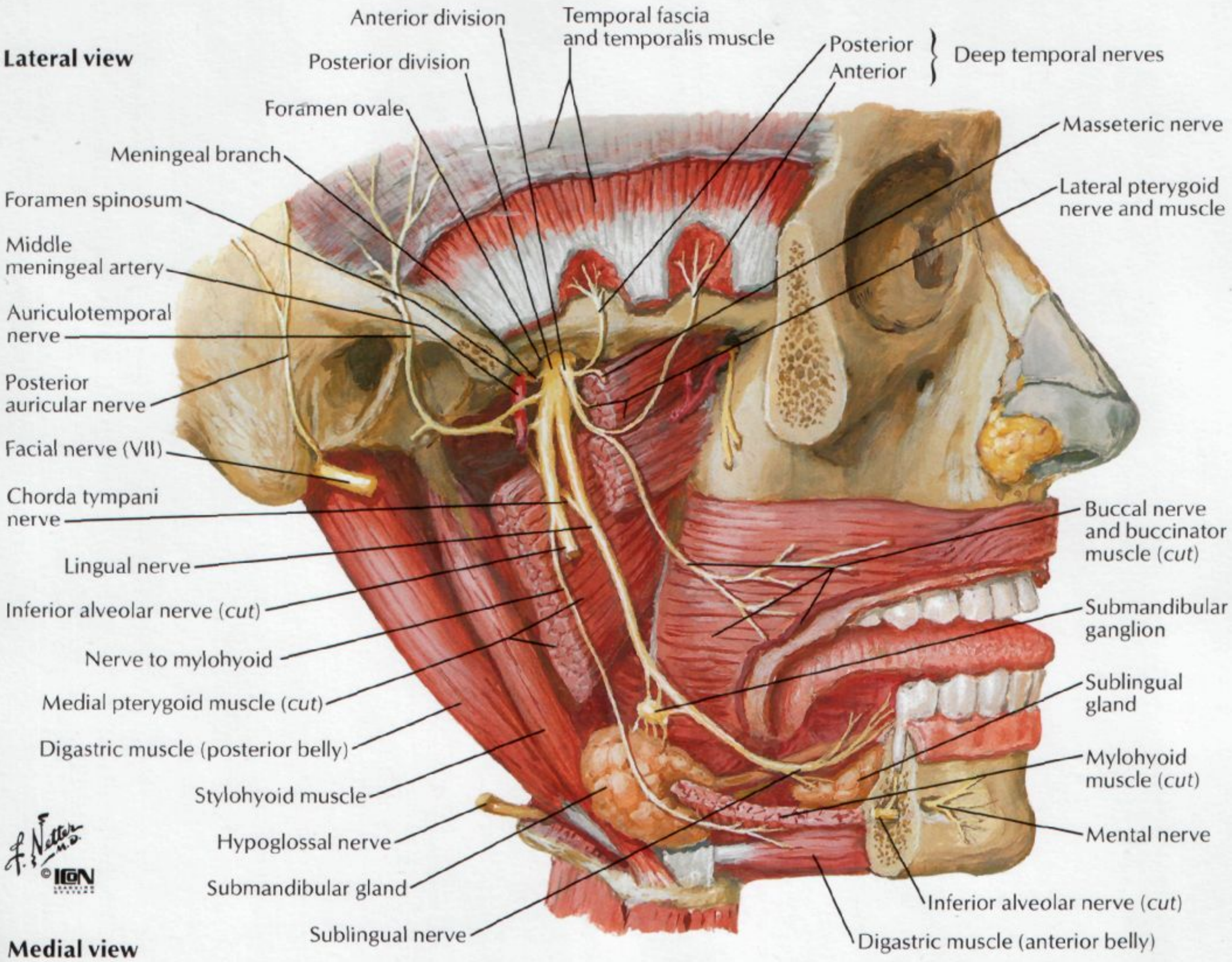
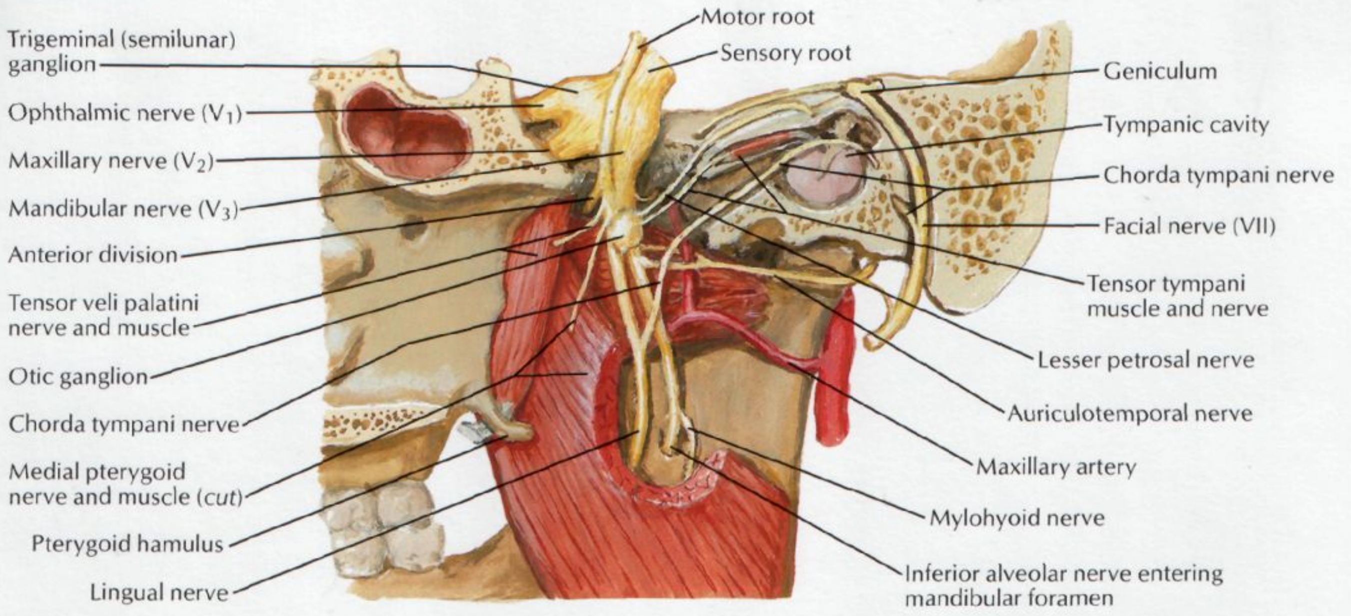
Mandibular Nerve (V_3)

SEE ALSO PLATES 67, 116

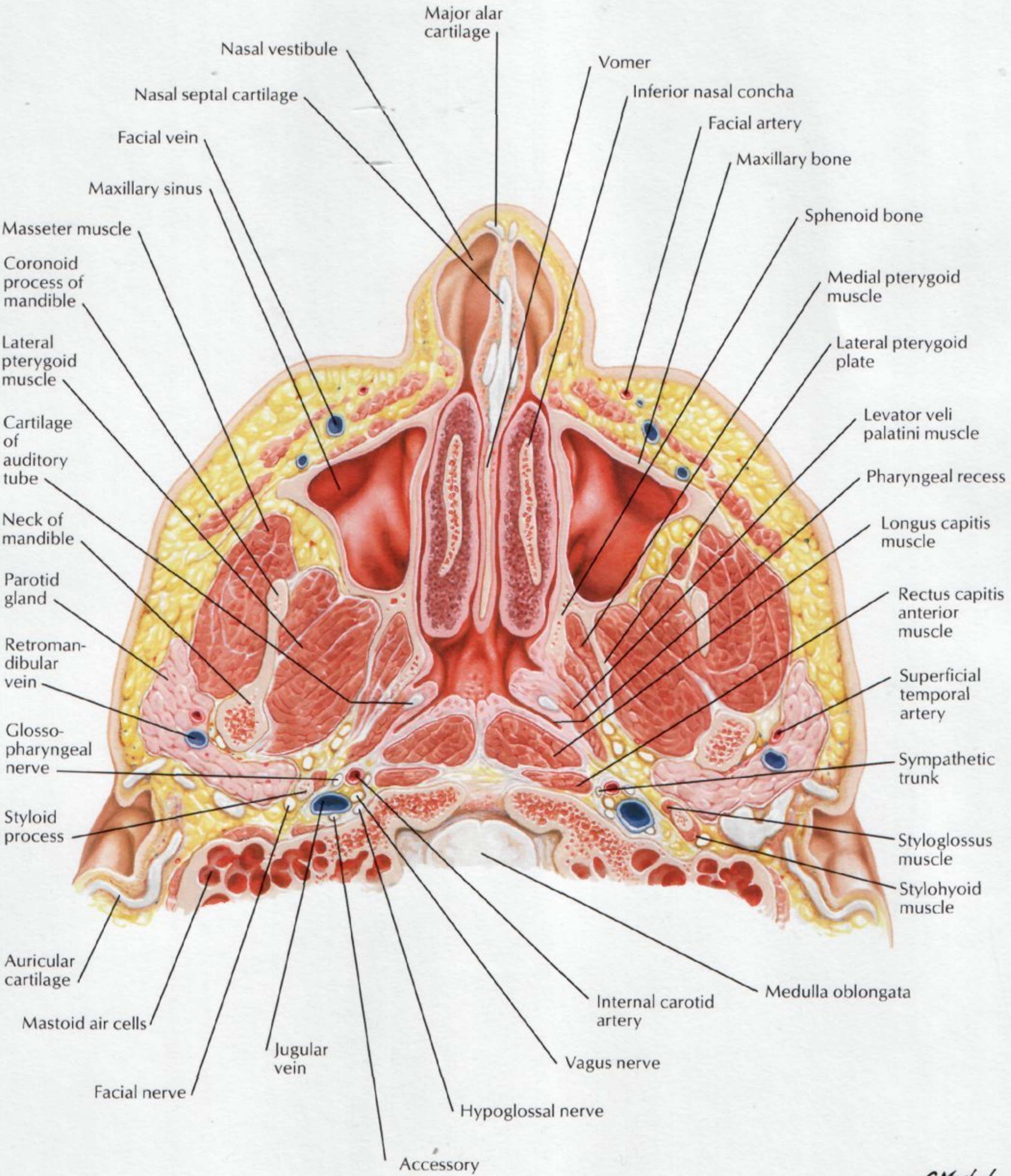
Lateral view



Medial view

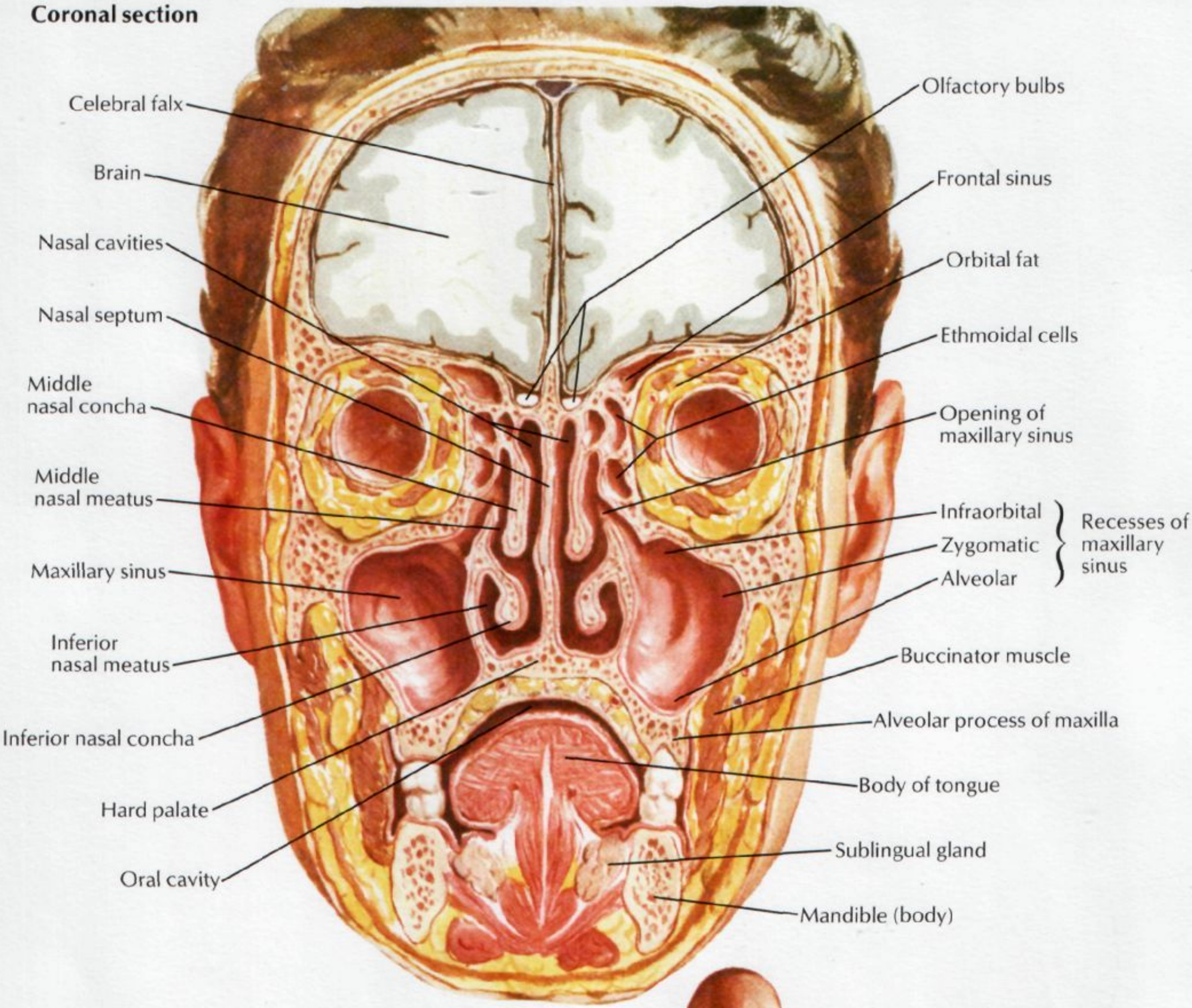


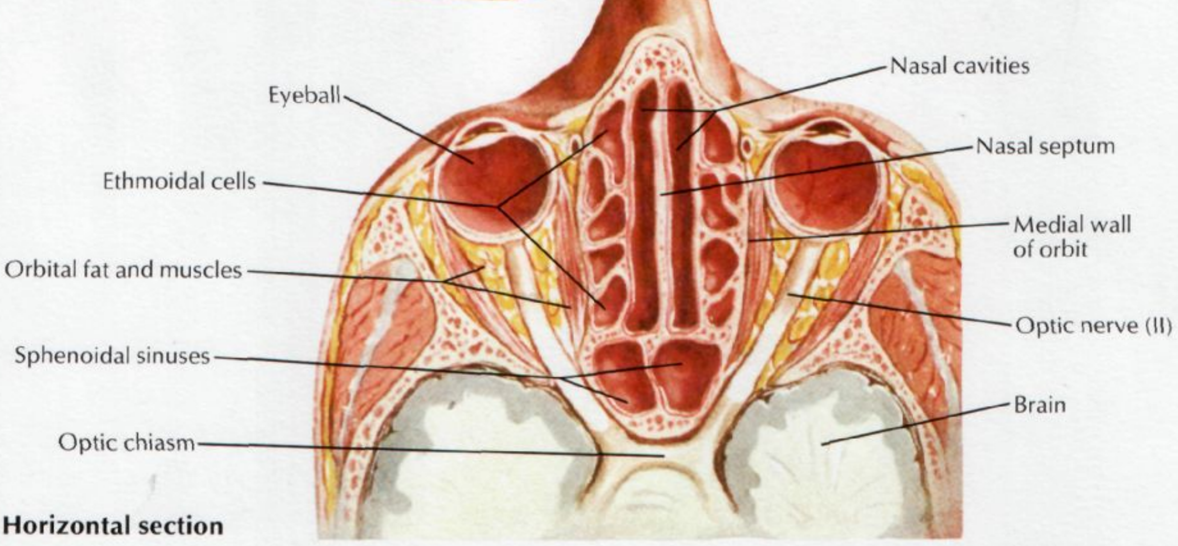
Nose and Paranasal Sinuses: Cross Section



Paranasal Sinuses

Coronal section





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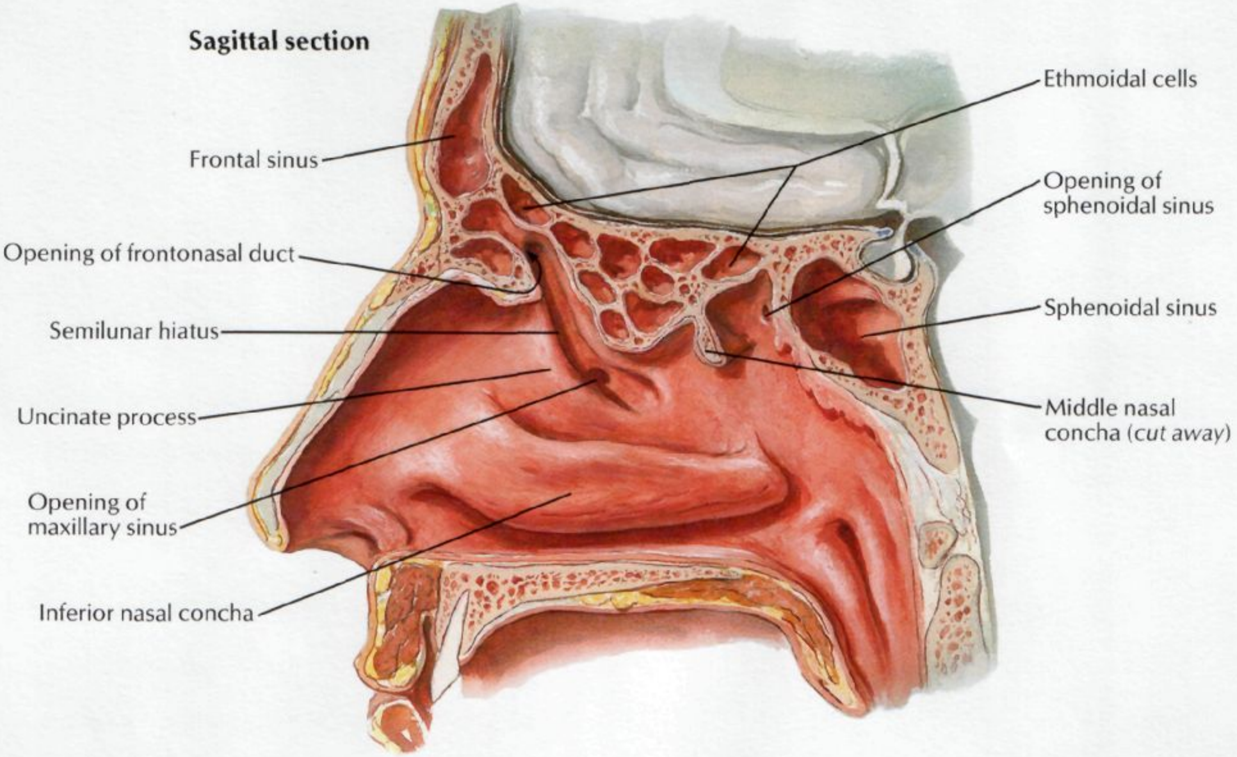
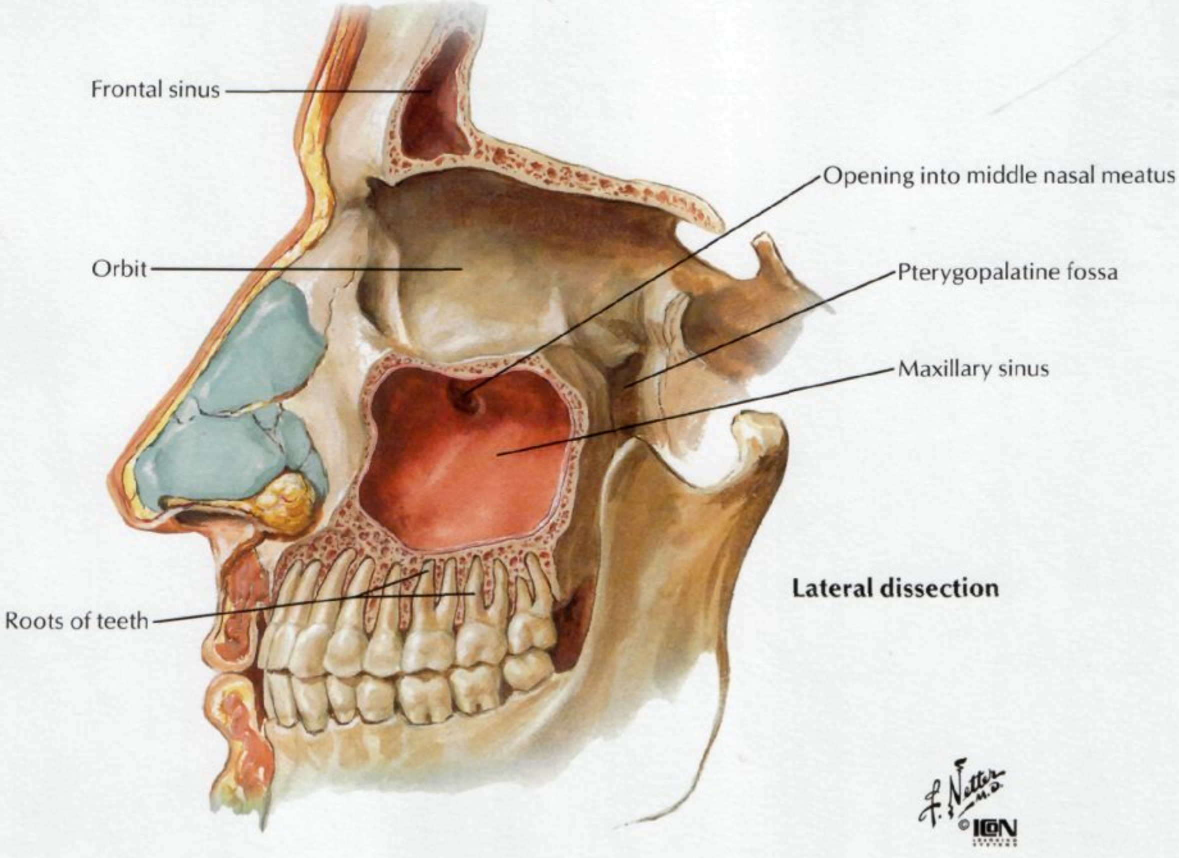
Horizontal section

Paranasal Sinuses (continued)



Sagittal section

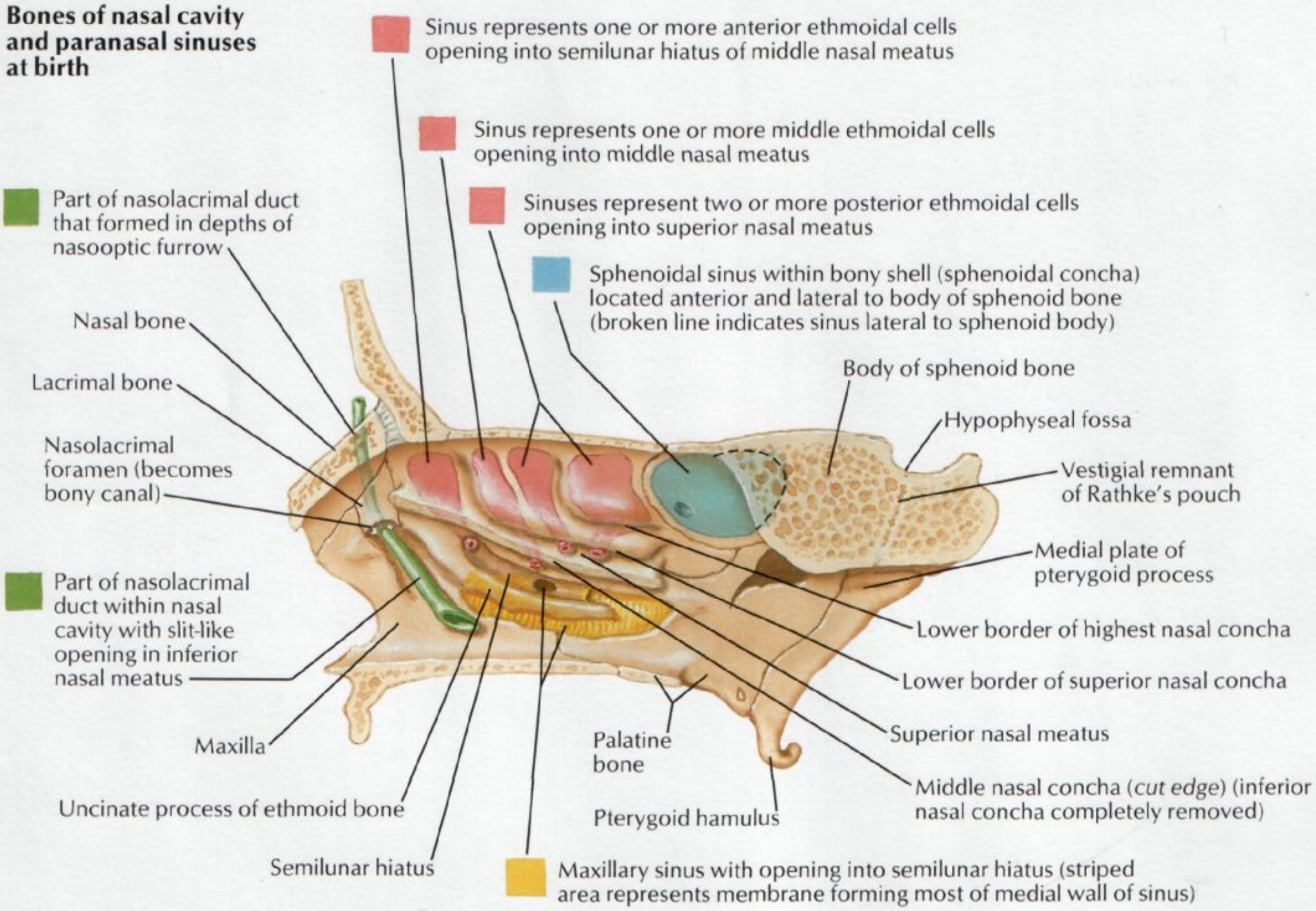
Frontal sinus
Opening of frontonasal duct
Semilunar hiatus
Uncinate process
Opening of maxillary sinus
Inferior nasal concha
Ethmoidal cells
Opening of sphenoidal sinus
Sphenoidal sinus
Middle nasal concha (*cut away*)



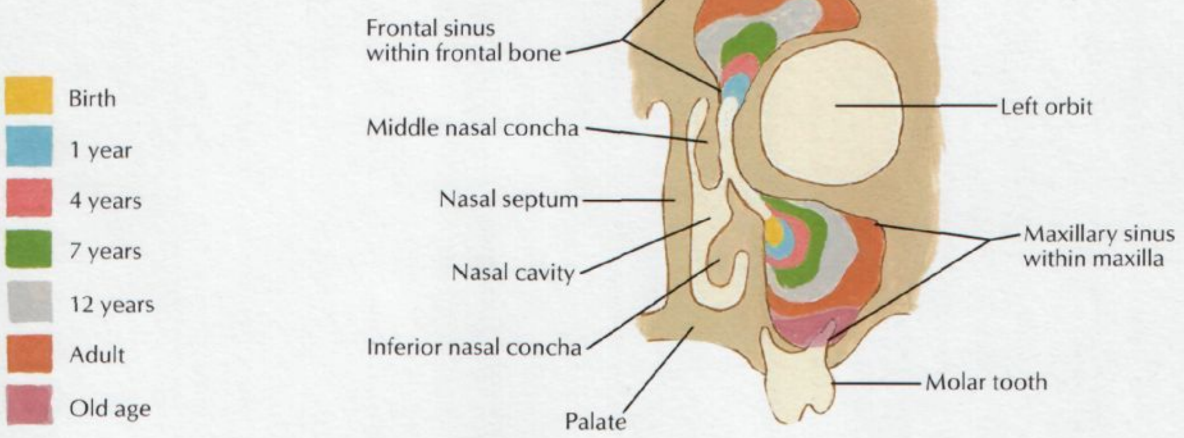
Lateral dissection

Paranasal Sinuses: Changes With Age

Bones of nasal cavity and paranasal sinuses at birth


🟥 Sinus represents one or more anterior ethmoidal cells opening into semilunar hiatus of middle nasal meatus
🟥 Sinus represents one or more middle ethmoidal cells opening into middle nasal meatus
🟥 Sinuses represent two or more posterior ethmoidal cells opening into superior nasal meatus
🟦 Sphenoidal sinus within bony shell (sphenoidal concha) located anterior and lateral to body of sphenoid bone (broken line indicates sinus lateral to sphenoid body)
🟩 Part of nasolacrimal duct that formed in depths of nasooptic furrow
Nasal bone
Lacrimal bone
Nasolacrimal foramen (becomes bony canal)
🟩 Part of nasolacrimal duct within nasal cavity with slit-like opening in inferior nasal meatus
Maxilla
Uncinate process of ethmoid bone
Semilunar hiatus
Body of sphenoid bone
Hypophyseal fossa
Vestigial remnant of Rathke's pouch
Medial plate of pterygoid process
Lower border of highest nasal concha
Lower border of superior nasal concha
Superior nasal meatus
Middle nasal concha (*cut edge*) (inferior nasal concha completely removed)
Palatine bone
Pterygoid hamulus
🟨 Maxillary sinus with opening into semilunar hiatus (striped area represents membrane forming most of medial wall of sinus)

Growth of frontal and maxillary sinuses throughout life



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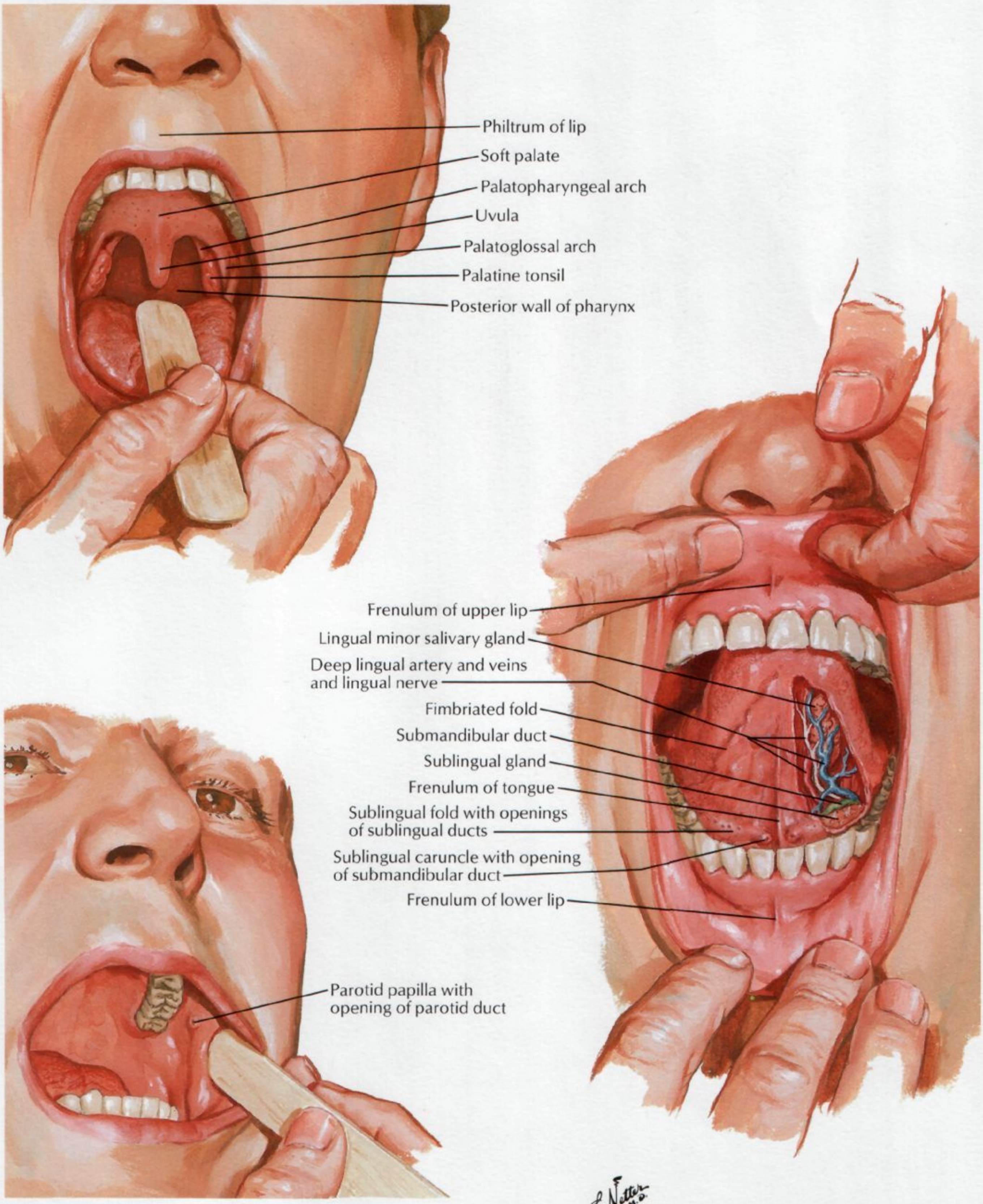
Philtrum of lip
Soft palate
Palatopharyngeal arch
Uvula
Palatoglossal arch
Palatine tonsil
Posterior wall of pharynx
Frenulum of upper lip
Lingual minor salivary gland
Deep lingual artery and veins and lingual nerve
Fimbriated fold
Submandibular duct
Sublingual gland
Frenulum of tongue
Sublingual fold with openings of sublingual ducts
Sublingual caruncle with opening of submandibular duct
Frenulum of lower lip
Parotid papilla with opening of parotid duct

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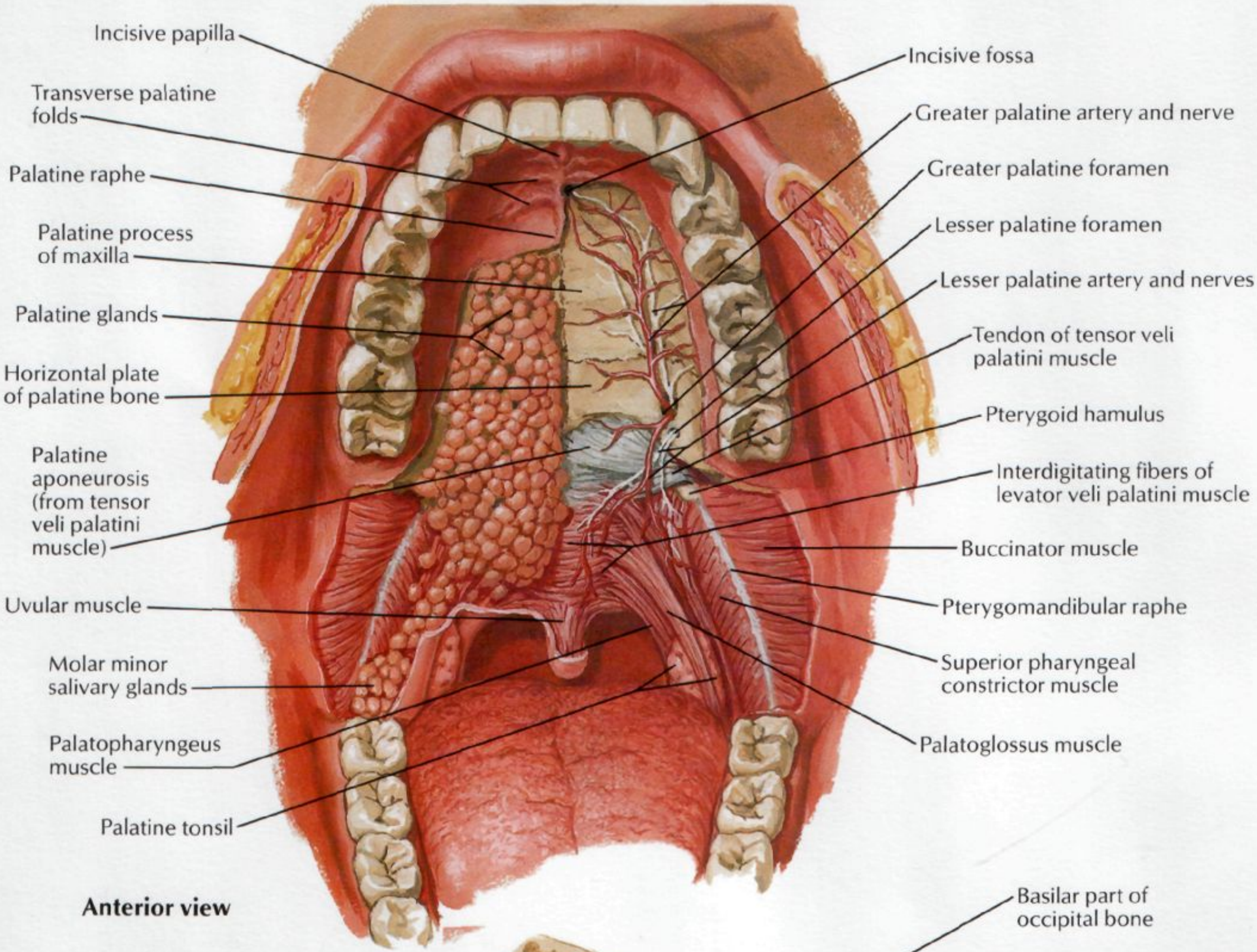
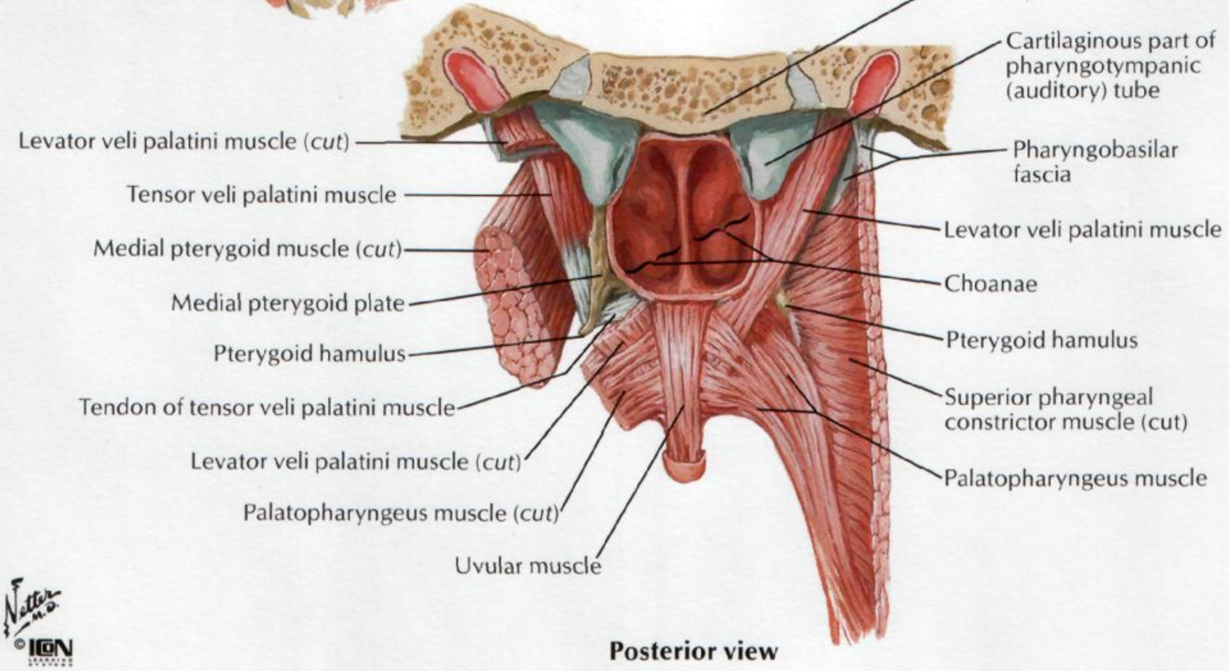
Roof of Mouth


Incisive papilla
Transverse palatine folds
Palatine raphe
Palatine process of maxilla
Palatine glands
Horizontal plate of palatine bone
Palatine aponeurosis (from tensor veli palatini muscle)
Uvular muscle
Molar minor salivary glands
Palatopharyngeus muscle
Palatine tonsil
Incisive fossa
Greater palatine artery and nerve
Greater palatine foramen
Lesser palatine foramen
Lesser palatine artery and nerves
Tendon of tensor veli palatini muscle
Pterygoid hamulus
Interdigitating fibers of levator veli palatini muscle
Buccinator muscle
Pterygomandibular raphe
Superior pharyngeal constrictor muscle
Palatoglossus muscle

Anterior view


Basilar part of occipital bone
Cartilaginous part of pharyngotympanic (auditory) tube
Pharyngobasilar fascia
Levator veli palatini muscle
Choanae
Pterygoid hamulus
Superior pharyngeal constrictor muscle (cut)
Palatopharyngeus muscle
Levator veli palatini muscle (*cut*)
Tensor veli palatini muscle
Medial pterygoid muscle (*cut*)
Medial pterygoid plate
Pterygoid hamulus
Tendon of tensor veli palatini muscle
Levator veli palatini muscle (*cut*)
Palatopharyngeus muscle (*cut*)
Uvular muscle

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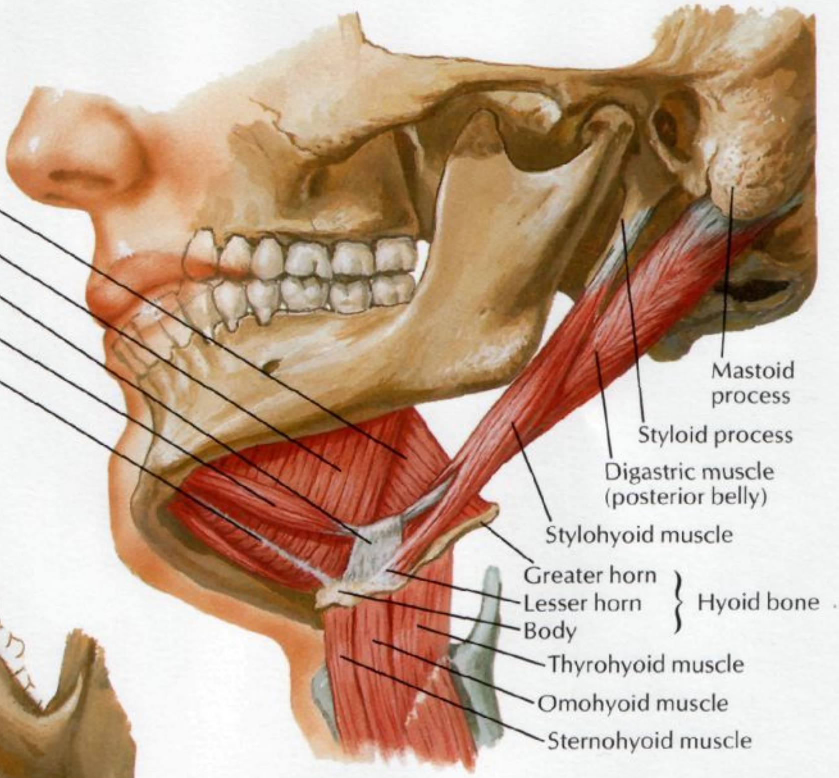
Posterior view

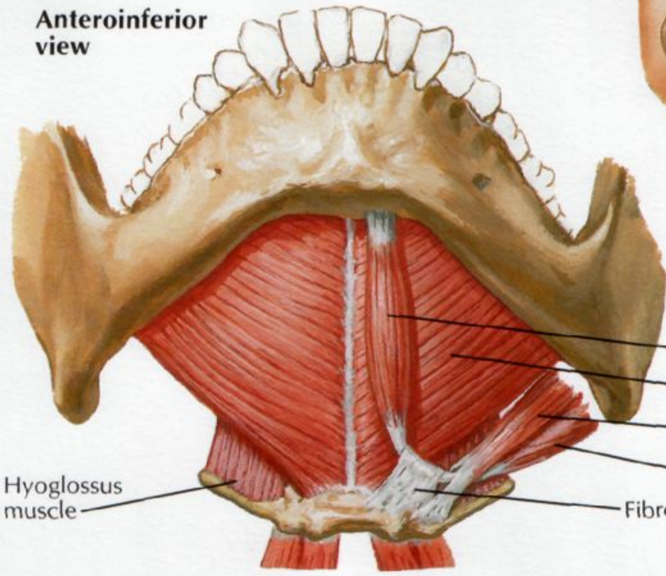
Floor of Mouth

SEE ALSO PLATE 25

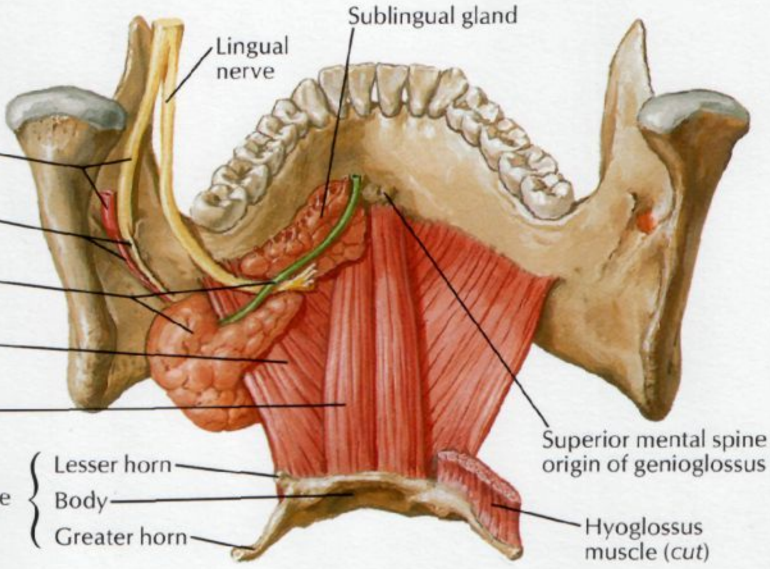
Lateral, slightly inferior view



Anteroinferior view

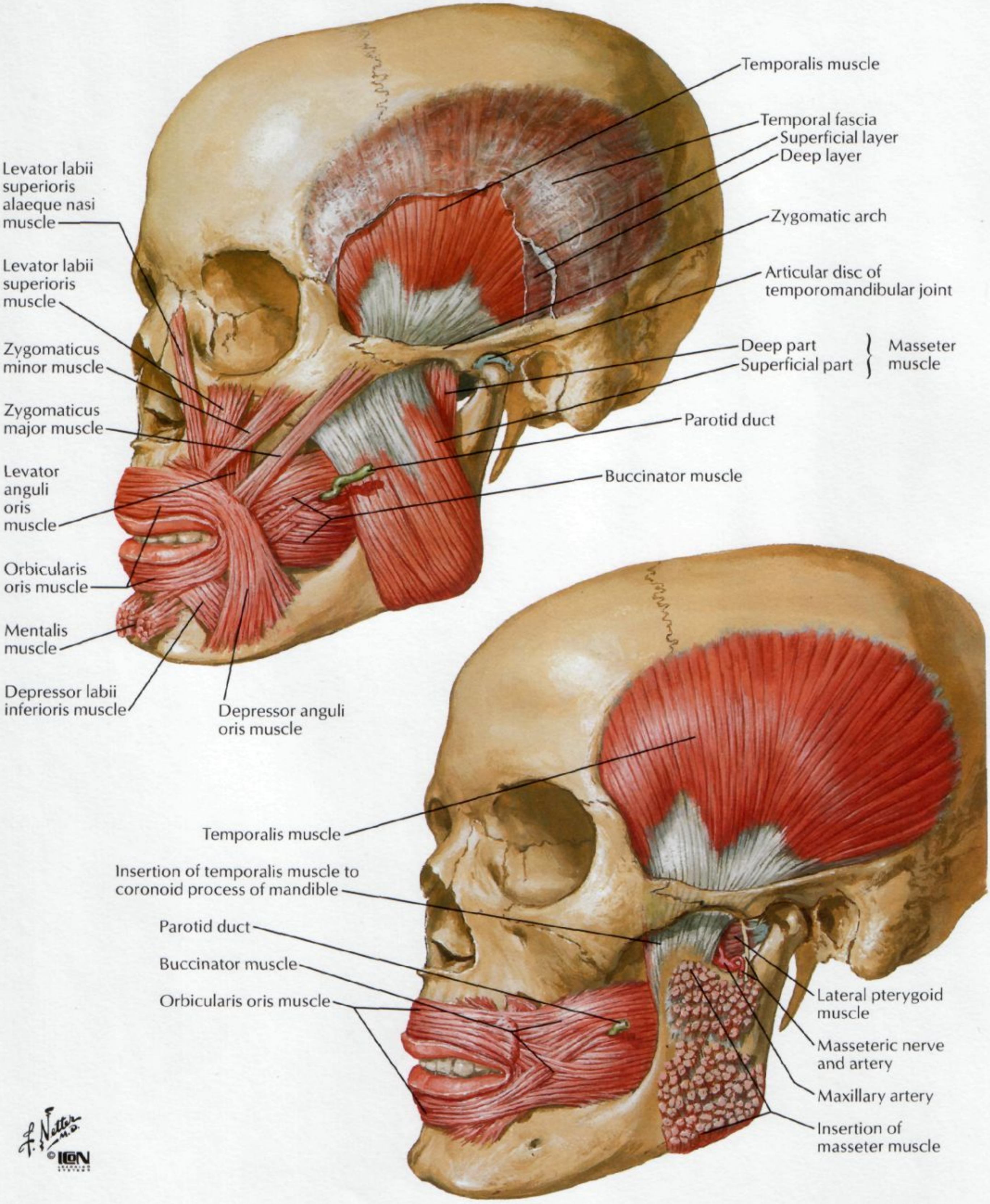

Digastric muscle (anterior belly)
Mylohyoid muscle
Stylohyoid muscle
Digastric muscle (posterior belly)
Hyoglossus muscle
Fibrous loop for intermediate digastric tendon

Posterosuperior view

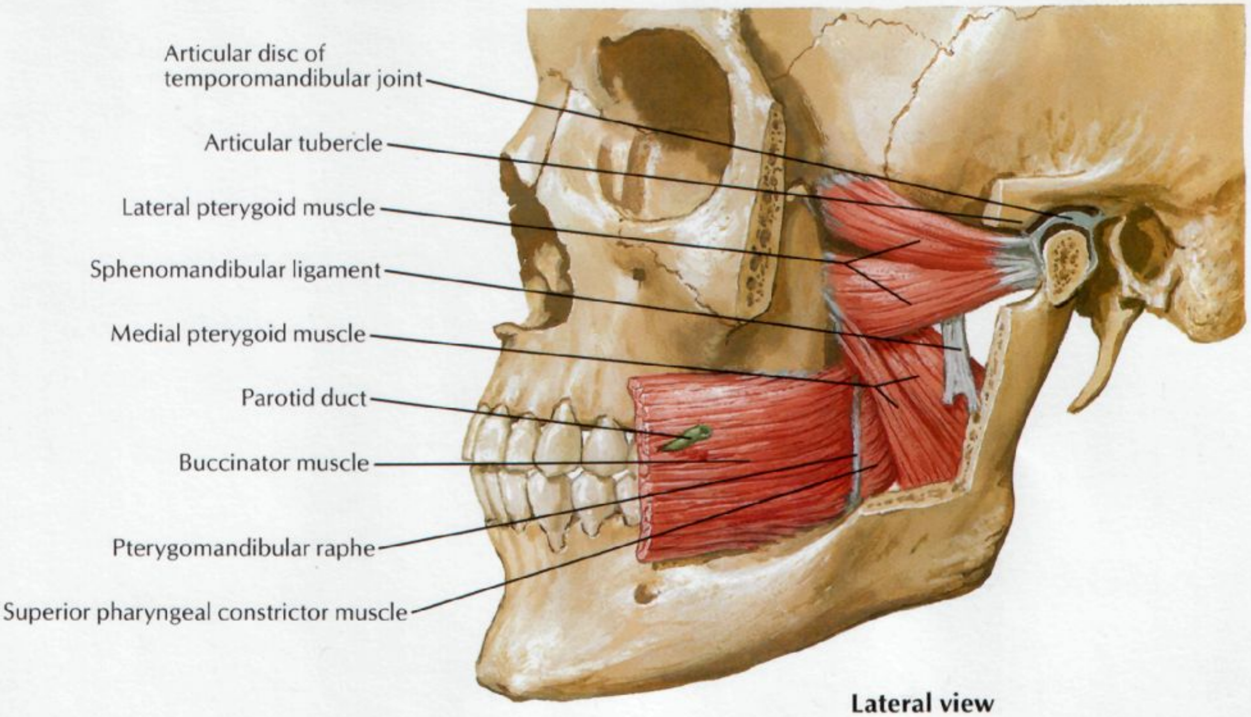

Sublingual gland
Lingual nerve
Inferior alveolar nerve and artery
Mylohyoid nerve and artery
Submandibular gland and duct
Mylohyoid muscle
Geniohyoid muscle
Superior mental spine for origin of genioglossus muscle
Hyoid bone
Lesser horn
Body
Greater horn
Hyoglossus muscle (cut)

Muscles Involved in Mastication

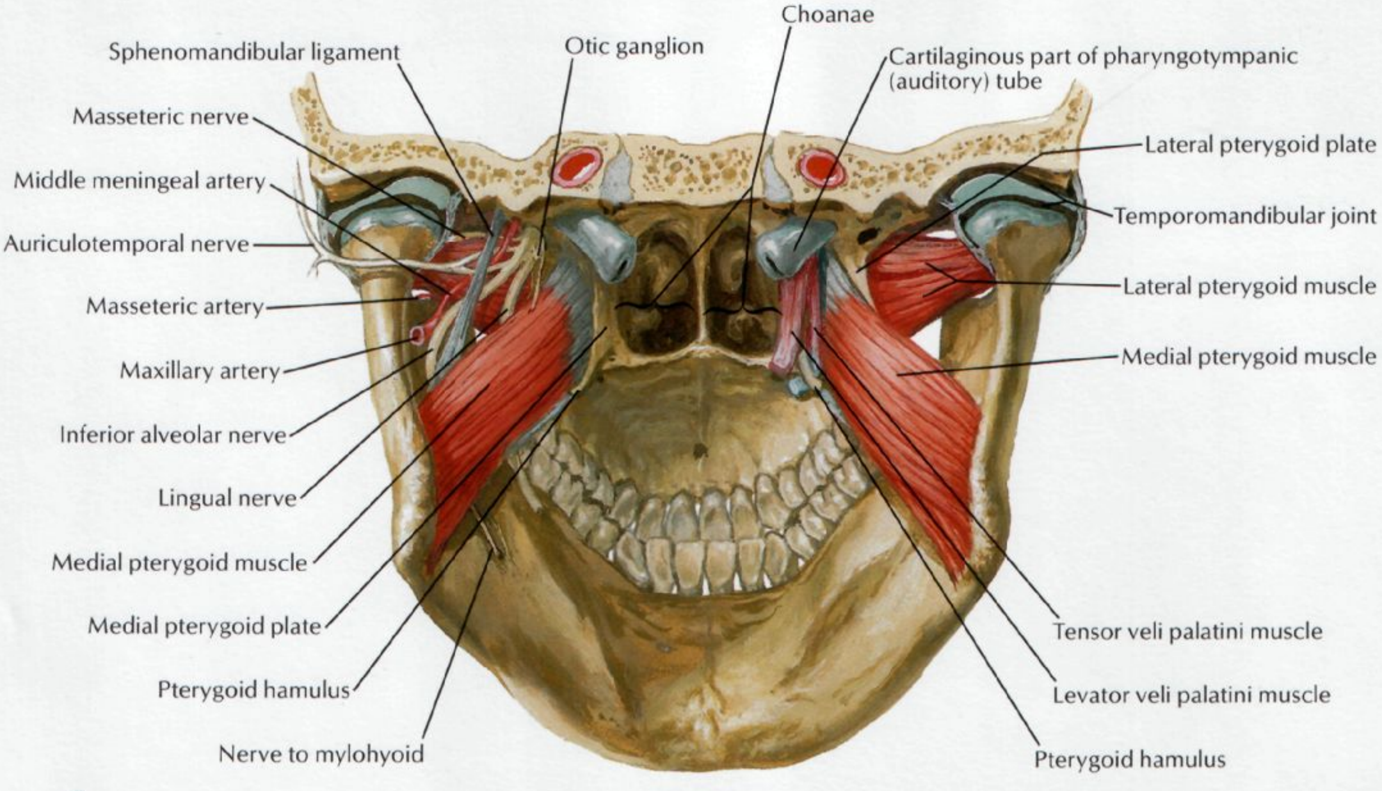
FOR FACIAL MUSCLES SEE PLATE 22



Muscles Involved in Mastication (continued)

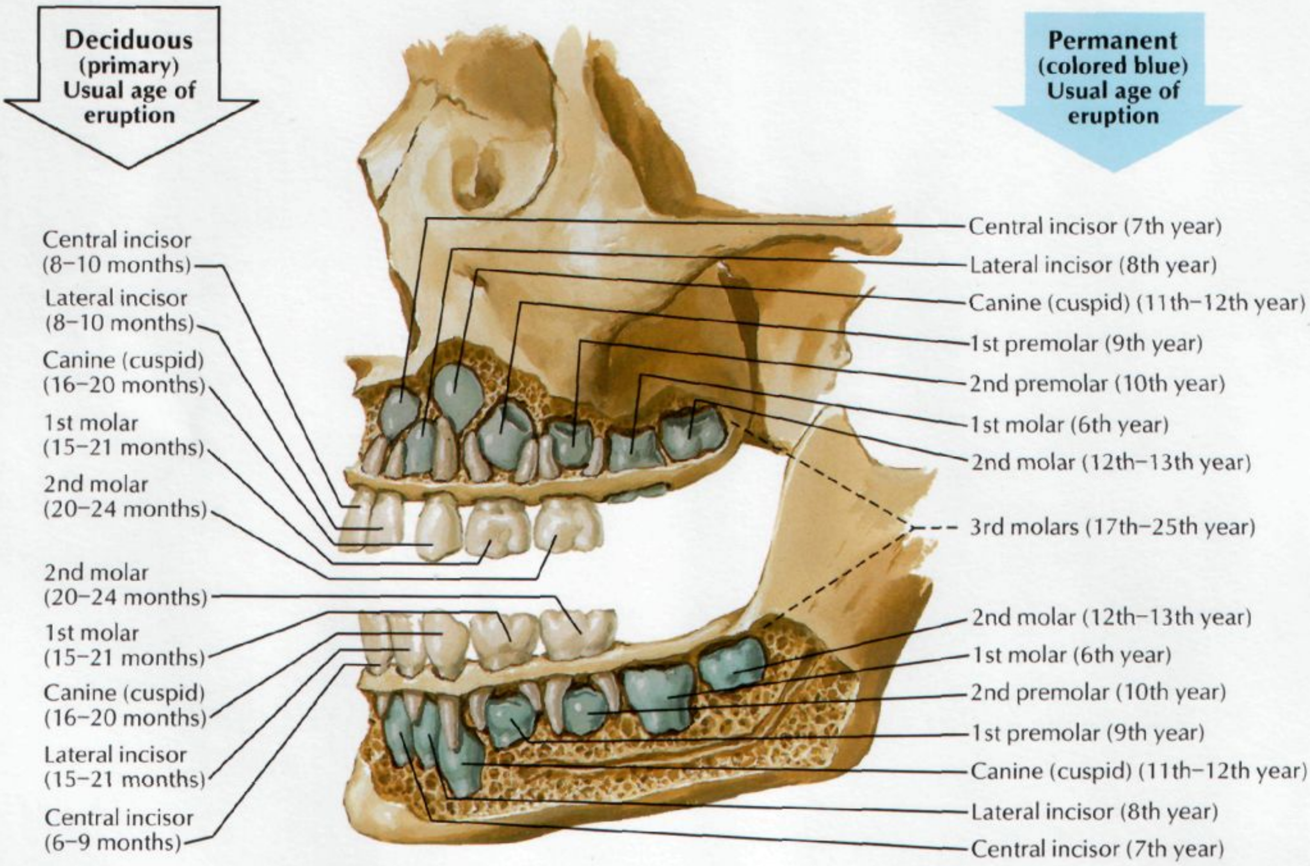


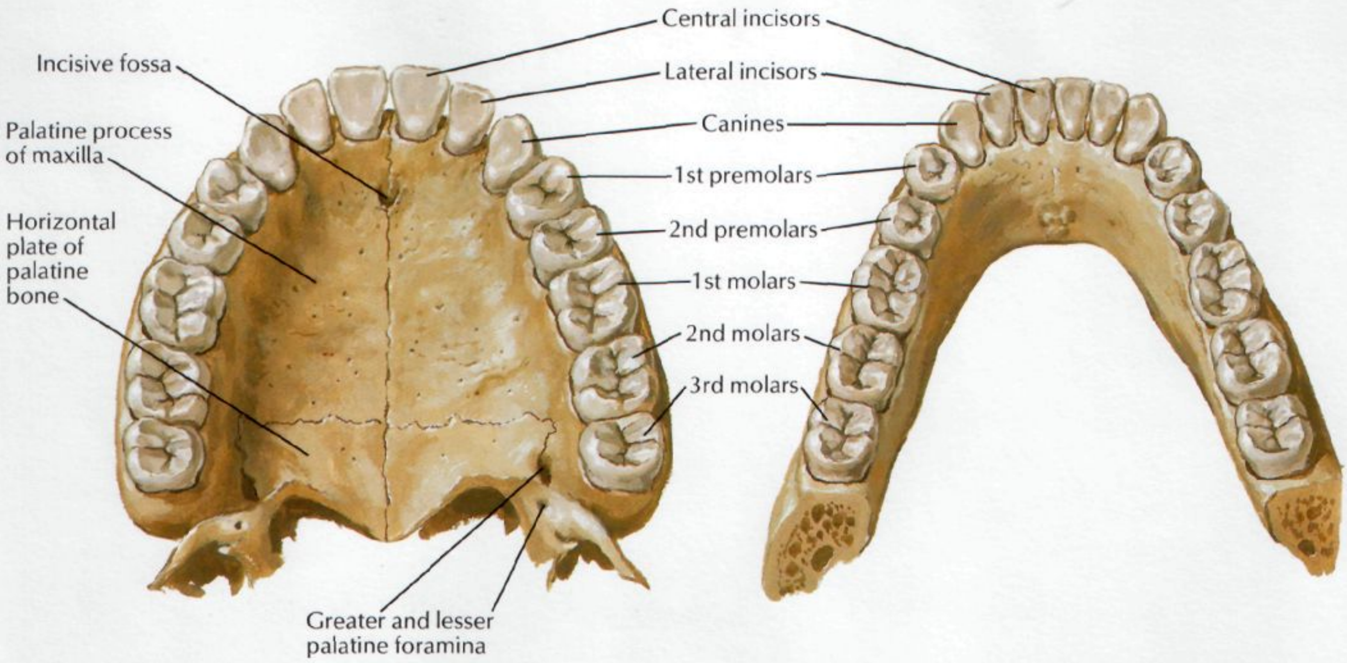
Lateral view



Posterior view

Teeth


Deciduous (primary) Usual age of eruption
Permanent (colored blue) Usual age of eruption
Central incisor (8–10 months)
Lateral incisor (8–10 months)
Canine (cuspid) (16–20 months)
1st molar (15–21 months)
2nd molar (20–24 months)
2nd molar (20–24 months)
1st molar (15–21 months)
Canine (cuspid) (16–20 months)
Lateral incisor (15–21 months)
Central incisor (6–9 months)
Central incisor (7th year)
Lateral incisor (8th year)
Canine (cuspid) (11th–12th year)
1st premolar (9th year)
2nd premolar (10th year)
1st molar (6th year)
2nd molar (12th–13th year)
3rd molars (17th–25th year)
2nd molar (12th–13th year)
1st molar (6th year)
2nd premolar (10th year)
1st premolar (9th year)
Canine (cuspid) (11th–12th year)
Lateral incisor (8th year)
Central incisor (7th year)



Upper permanent teeth

Lower permanent teeth

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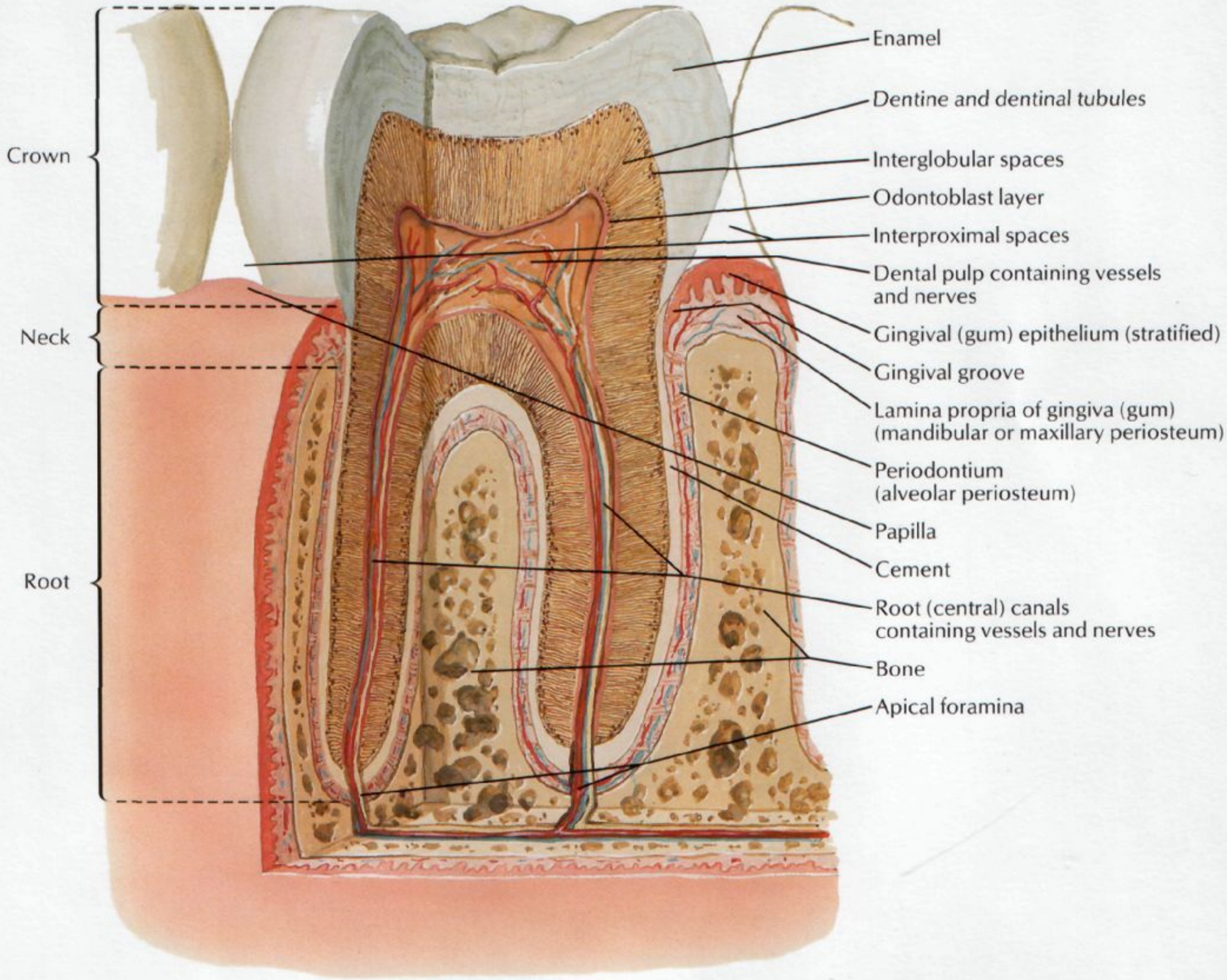
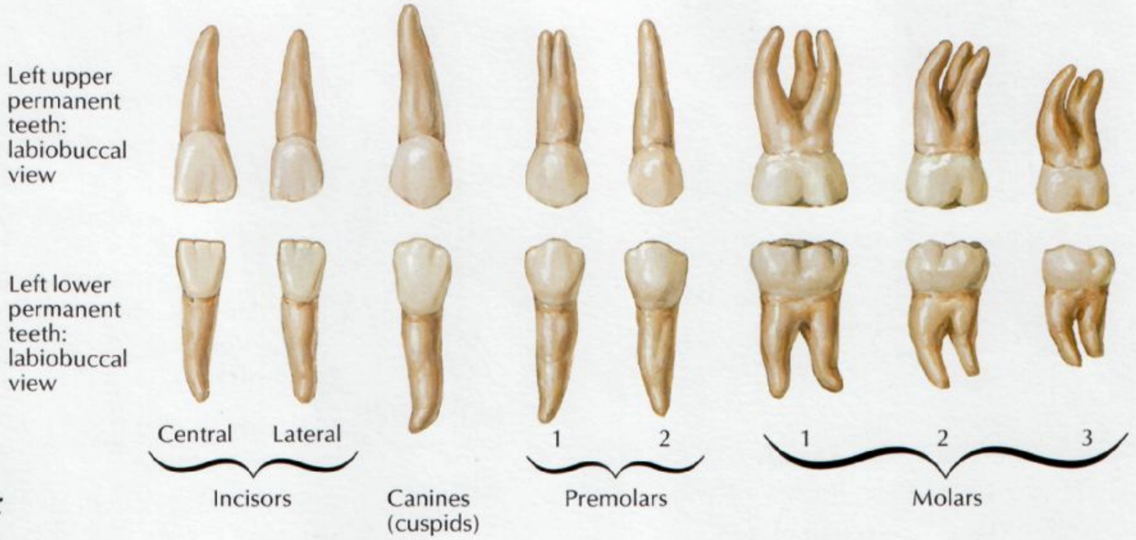

Crown
Neck
Root
Enamel
Dentine and dentinal tubules
Interglobular spaces
Odontoblast layer
Interproximal spaces
Dental pulp containing vessels and nerves
Gingival (gum) epithelium (stratified)
Gingival groove
Lamina propria of gingiva (gum) (mandibular or maxillary periosteum)
Periodontium (alveolar periosteum)
Papilla
Cement
Root (central) canals containing vessels and nerves
Bone
Apical foramina


Left upper permanent teeth: labiobuccal view
Left lower permanent teeth: labiobuccal view
Central
Lateral
Incisors
Canines (cuspids)
1
2
Premolars
1
2
3
Molars

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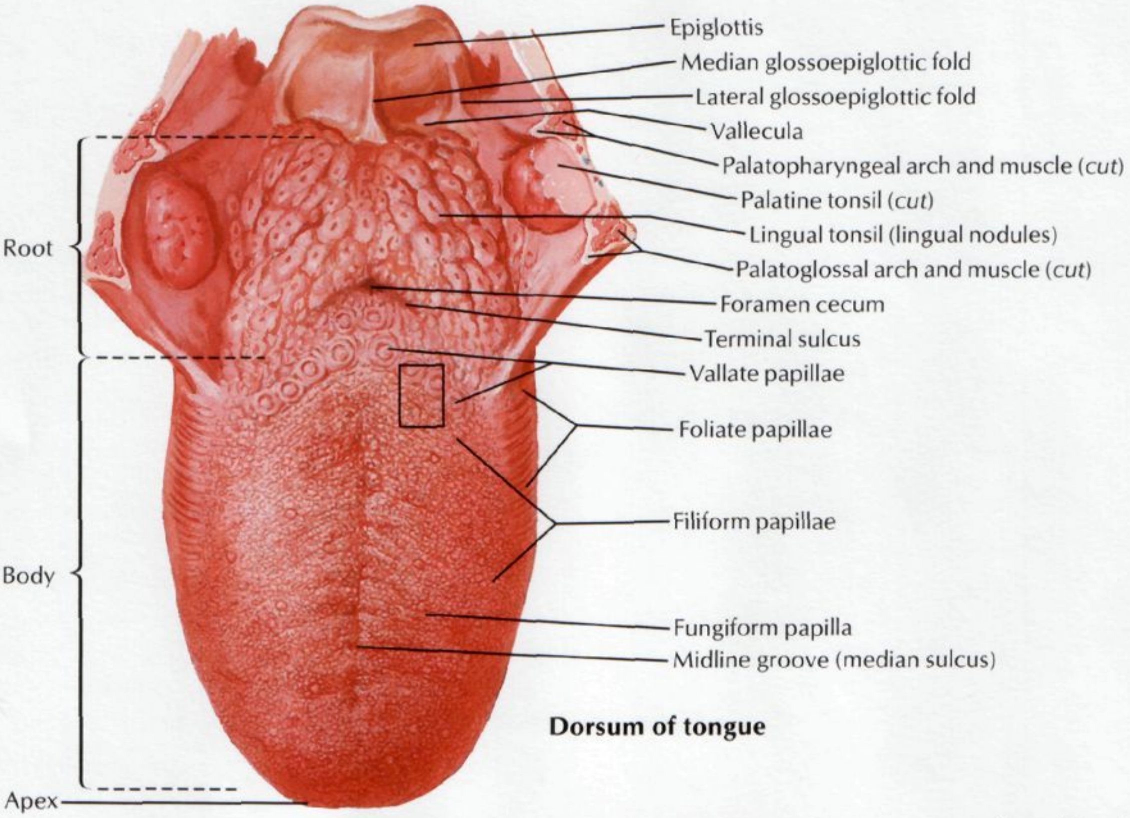
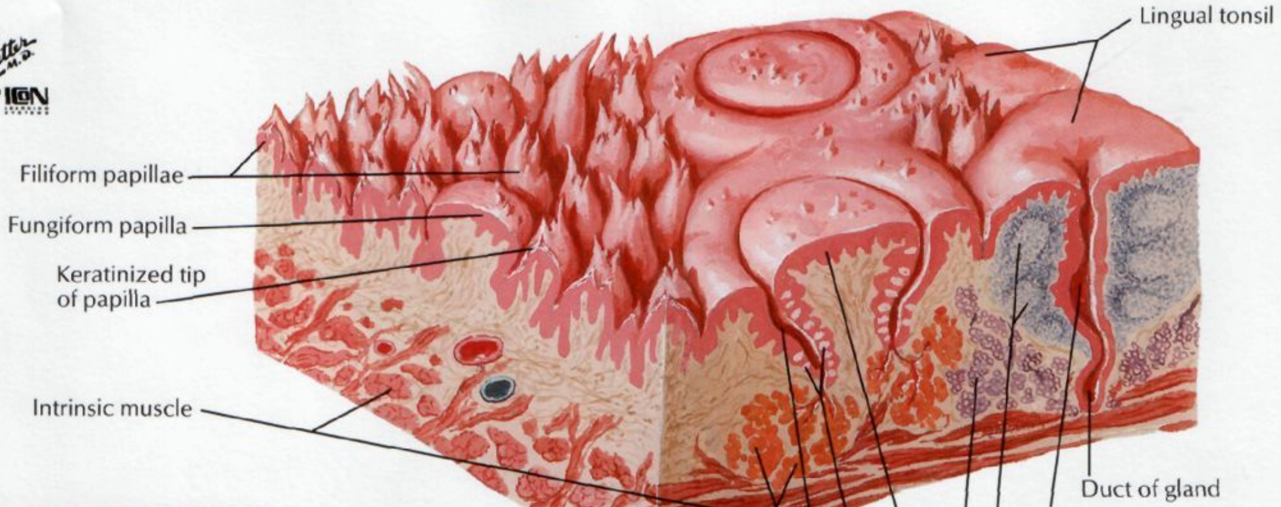
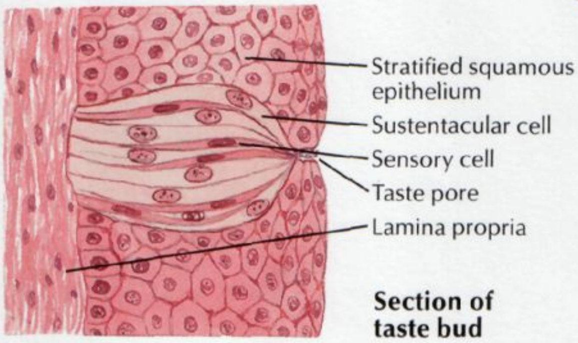
Tongue


Epiglottis
Median glossoepiglottic fold
Lateral glossoepiglottic fold
Vallecula
Palatopharyngeal arch and muscle (*cut*)
Palatine tonsil (*cut*)
Lingual tonsil (lingual nodules)
Palatoglossal arch and muscle (*cut*)
Foramen cecum
Terminal sulcus
Vallate papillae
Foliate papillae
Filiform papillae
Fungiform papilla
Midline groove (median sulcus)
Root
Body
Apex

Dorsum of tongue



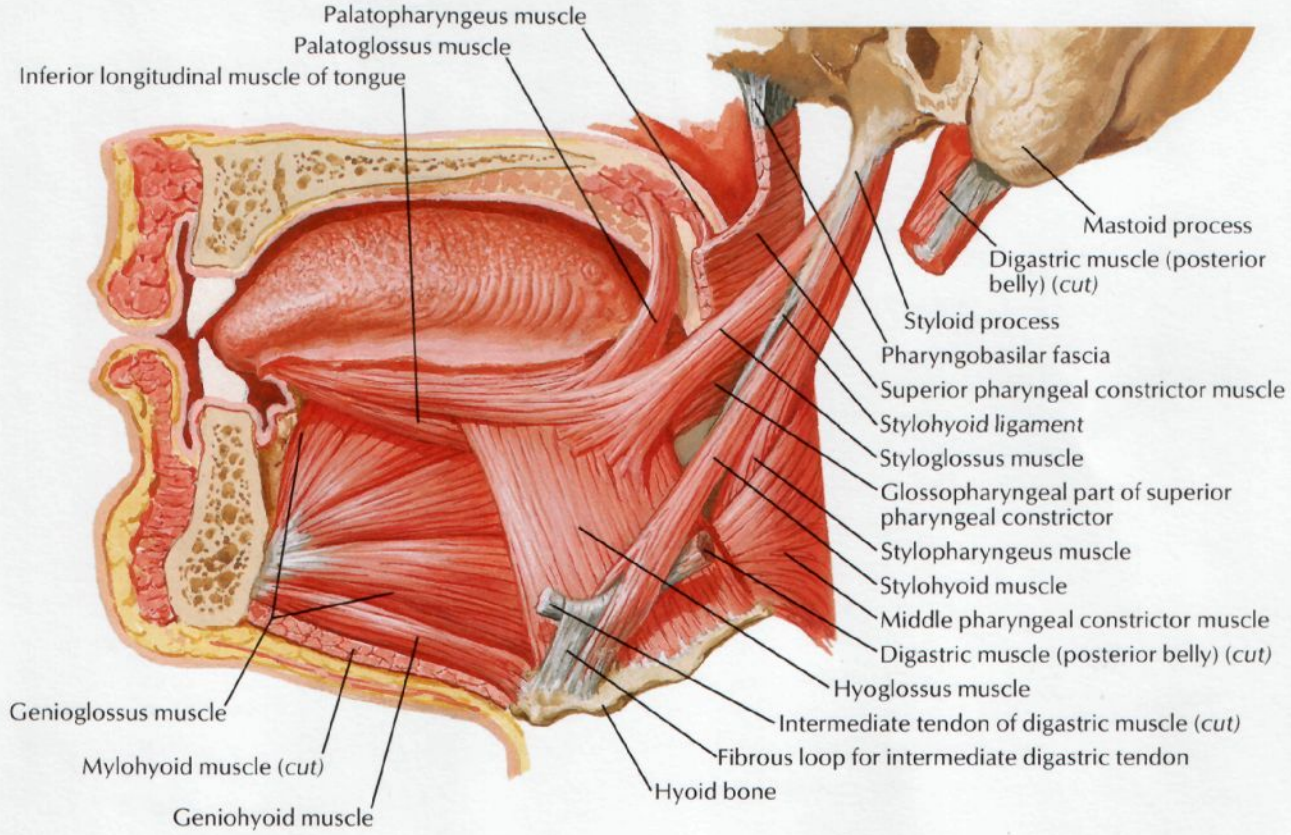
Schematic stereogram: area indicated above

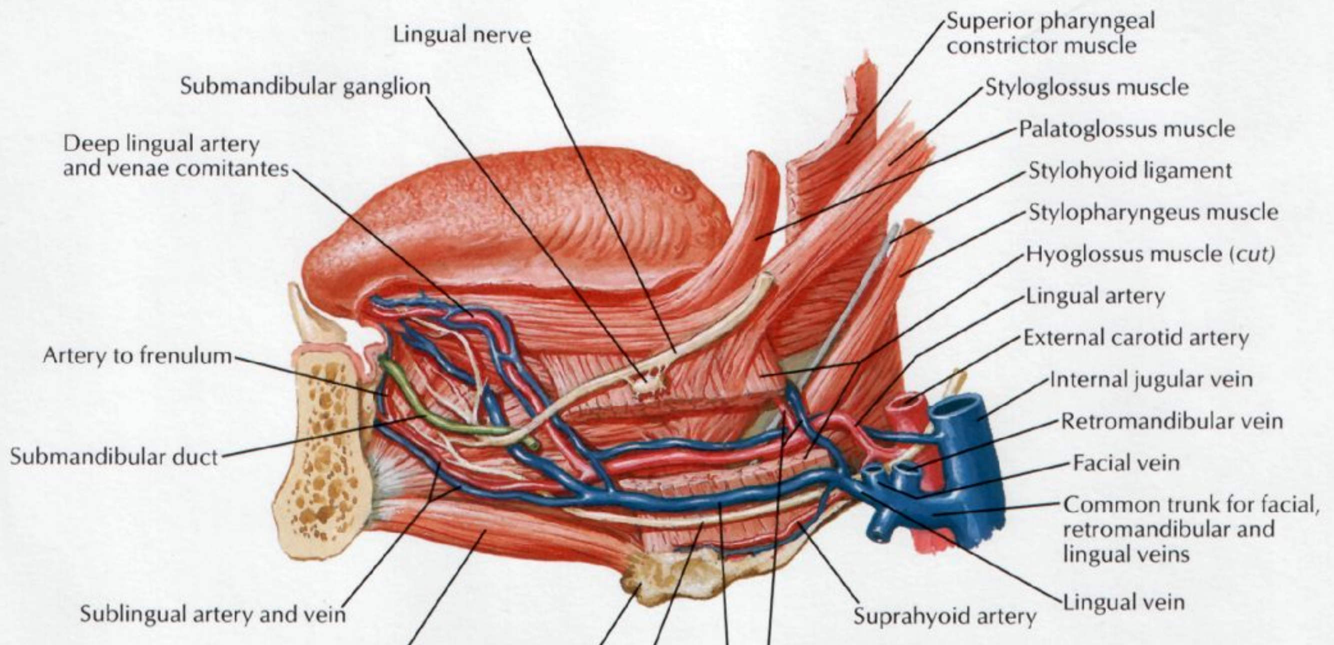


Section of taste bud

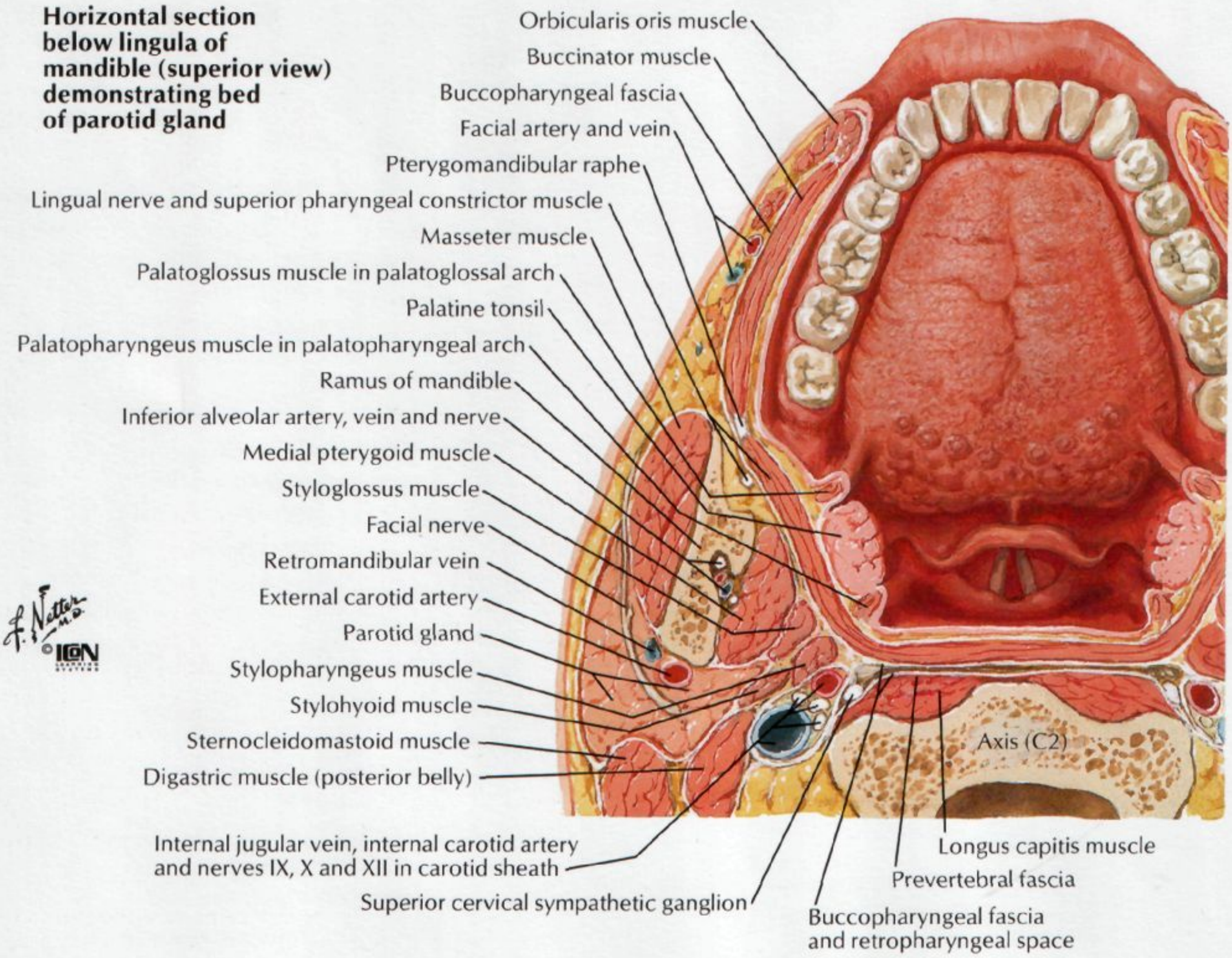
Tongue (continued)

SEE ALSO PLATES 30, 42, 49, 122


Palatopharyngeus muscle
Palatoglossus muscle
Inferior longitudinal muscle of tongue
Mastoid process
Digastric muscle (posterior belly) (*cut*)
Styloid process
Pharyngobasilar fascia
Superior pharyngeal constrictor muscle
Stylohyoid ligament
Styloglossus muscle
Glossopharyngeal part of superior pharyngeal constrictor
Stylopharyngeus muscle
Stylohyoid muscle
Middle pharyngeal constrictor muscle
Digastric muscle (posterior belly) (*cut*)
Hyoglossus muscle
Intermediate tendon of digastric muscle (*cut*)
Fibrous loop for intermediate digastric tendon
Hyoid bone
Genioglossus muscle
Mylohyoid muscle (*cut*)
Geniohyoid muscle

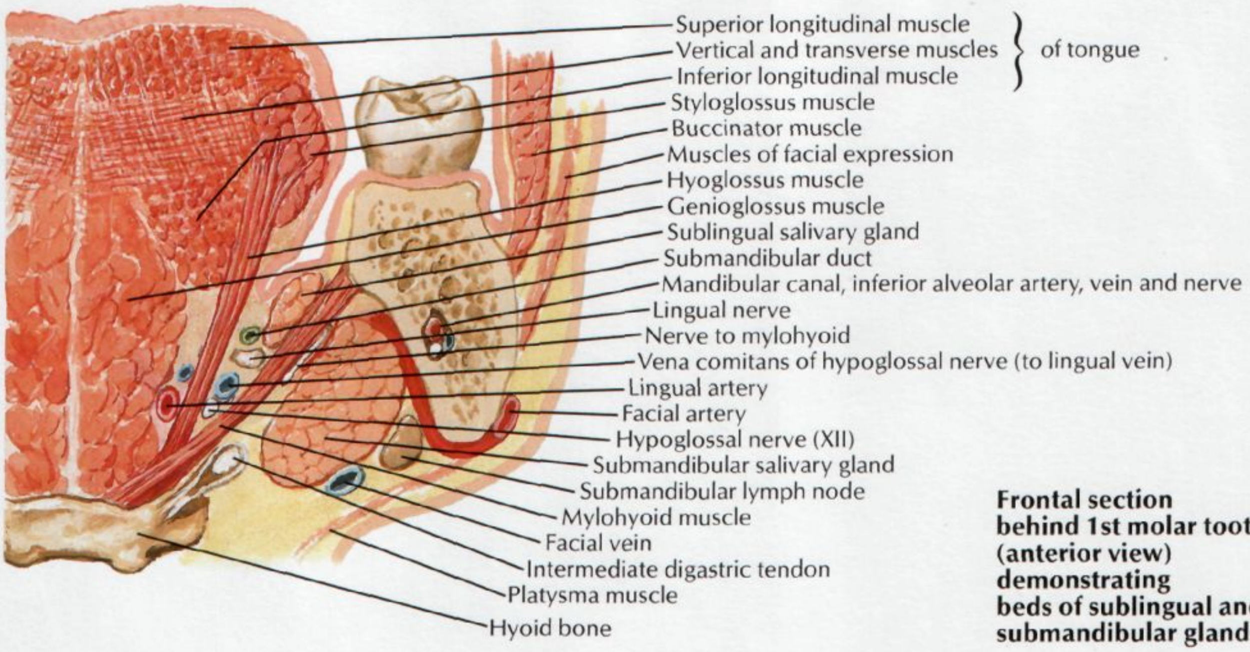


Tongue and Salivary Glands: Sections



Horizontal section below lingula of mandible (superior view) demonstrating bed of parotid gland

Orbicularis oris muscle
Buccinator muscle
Buccopharyngeal fascia
Facial artery and vein
Pterygomandibular raphe
Lingual nerve and superior pharyngeal constrictor muscle
Masseter muscle
Palatoglossus muscle in palatoglossal arch
Palatine tonsil
Palatopharyngeus muscle in palatopharyngeal arch
Ramus of mandible
Inferior alveolar artery, vein and nerve
Medial pterygoid muscle
Styloglossus muscle
Facial nerve
Retromandibular vein
External carotid artery
Parotid gland
Stylopharyngeus muscle
Stylohyoid muscle
Sternocleidomastoid muscle
Digastric muscle (posterior belly)
Internal jugular vein, internal carotid artery and nerves IX, X and XII in carotid sheath
Superior cervical sympathetic ganglion
Buccopharyngeal fascia and retropharyngeal space
Prevertebral fascia
Longus capitis muscle
Axis (C2)

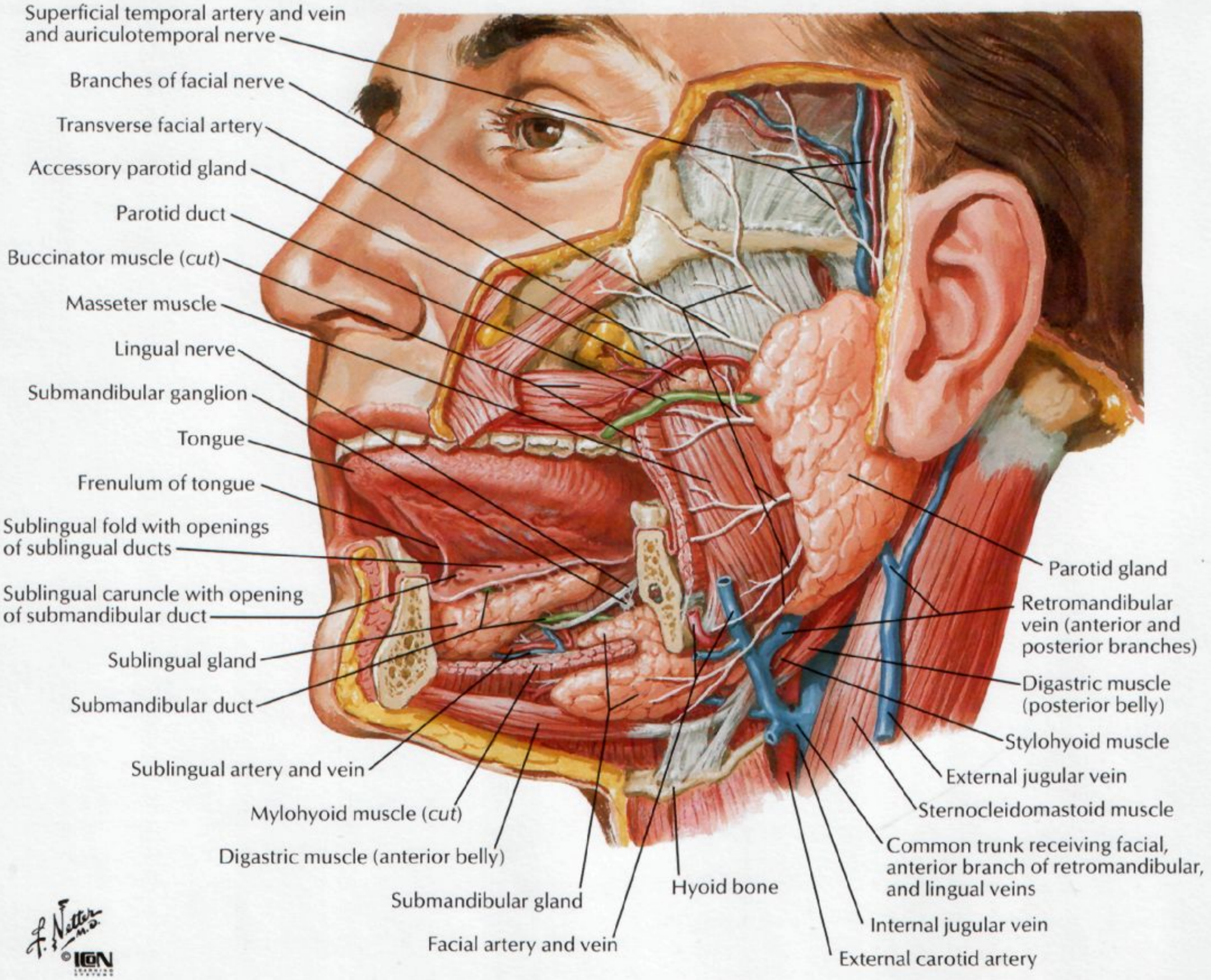


Frontal section behind 1st molar tooth (anterior view) demonstrating beds of sublingual and submandibular glands

Superior longitudinal muscle
Vertical and transverse muscles
Inferior longitudinal muscle
of tongue
Styloglossus muscle
Buccinator muscle
Muscles of facial expression
Hyoglossus muscle
Genioglossus muscle
Sublingual salivary gland
Submandibular duct
Mandibular canal, inferior alveolar artery, vein and nerve
Lingual nerve
Nerve to mylohyoid
Vena comitans of hypoglossal nerve (to lingual vein)
Lingual artery
Facial artery
Hypoglossal nerve (XII)
Submandibular salivary gland
Submandibular lymph node
Mylohyoid muscle
Facial vein
Intermediate digastric tendon
Platysma muscle
Hyoid bone

Salivary Glands

SEE ALSO PLATES 21, 49, 127, 128, 160


Superficial temporal artery and vein and auriculotemporal nerve
Branches of facial nerve
Transverse facial artery
Accessory parotid gland
Parotid duct
Buccinator muscle (*cut*)
Masseter muscle
Lingual nerve
Submandibular ganglion
Tongue
Frenulum of tongue
Sublingual fold with openings of sublingual ducts
Sublingual caruncle with opening of submandibular duct
Sublingual gland
Submandibular duct
Sublingual artery and vein
Mylohyoid muscle (*cut*)
Digastric muscle (anterior belly)
Submandibular gland
Facial artery and vein
Hyoid bone
Parotid gland
Retromandibular vein (anterior and posterior branches)
Digastric muscle (posterior belly)
Stylohyoid muscle
External jugular vein
Sternocleidomastoid muscle
Common trunk receiving facial, anterior branch of retromandibular, and lingual veins
Internal jugular vein
External carotid artery
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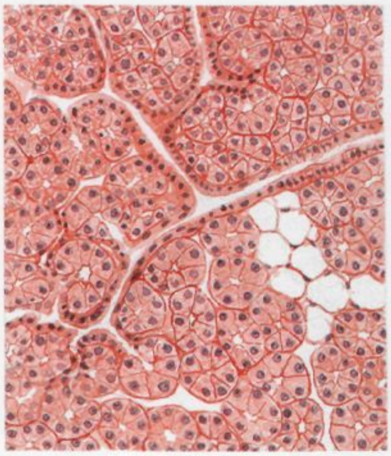
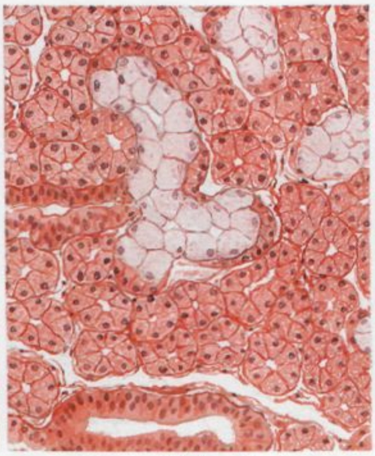
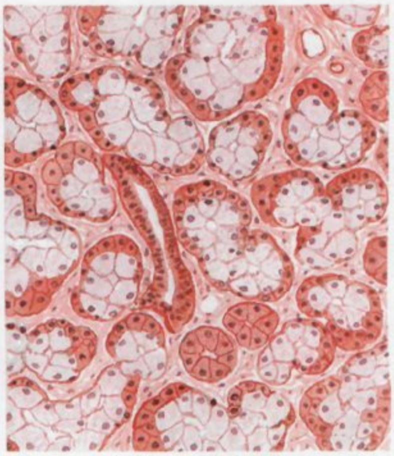


Parotid gland:
totally serous



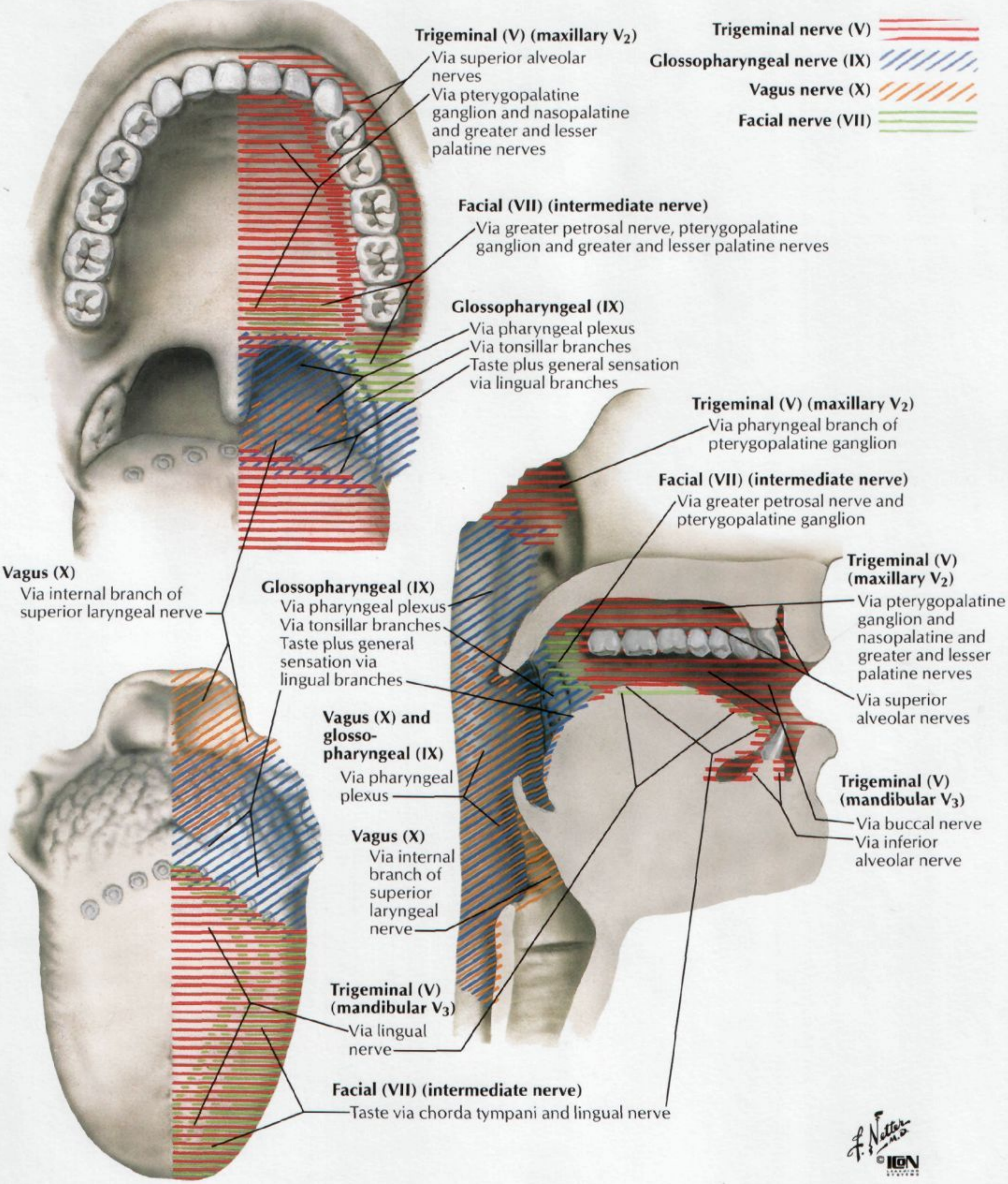
Submandibular gland:
mostly serous, partially mucous



Sublingual gland:
almost completely mucous

Afferent Innervation of Mouth and Pharynx

SEE ALSO PLATES 42, 48, 55, 60, 116, 117, 119, 127, 129



Trigeminal nerve (V)
Glossopharyngeal nerve (IX)
Vagus nerve (X)
Facial nerve (VII)
Trigeminal (V) (maxillary V_2)
Via superior alveolar nerves
Via pterygopalatine ganglion and nasopalatine and greater and lesser palatine nerves
Facial (VII) (intermediate nerve)
Via greater petrosal nerve, pterygopalatine ganglion and greater and lesser palatine nerves
Glossopharyngeal (IX)
Via pharyngeal plexus
Via tonsillar branches
Taste plus general sensation via lingual branches
Trigeminal (V) (maxillary V_2)
Via pharyngeal branch of pterygopalatine ganglion
Facial (VII) (intermediate nerve)
Via greater petrosal nerve and pterygopalatine ganglion
Trigeminal (V) (maxillary V_2)
Via pterygopalatine ganglion and nasopalatine and greater and lesser palatine nerves
Via superior alveolar nerves
Vagus (X)
Via internal branch of superior laryngeal nerve
Glossopharyngeal (IX)
Via pharyngeal plexus
Via tonsillar branches
Taste plus general sensation via lingual branches
Vagus (X) and glosso-pharyngeal (IX)
Via pharyngeal plexus
Vagus (X)
Via internal branch of superior laryngeal nerve
Trigeminal (V) (mandibular V_3)
Via buccal nerve
Via inferior alveolar nerve
Trigeminal (V) (mandibular V_3)
Via lingual nerve
Facial (VII) (intermediate nerve)
Taste via chorda tympani and lingual nerve
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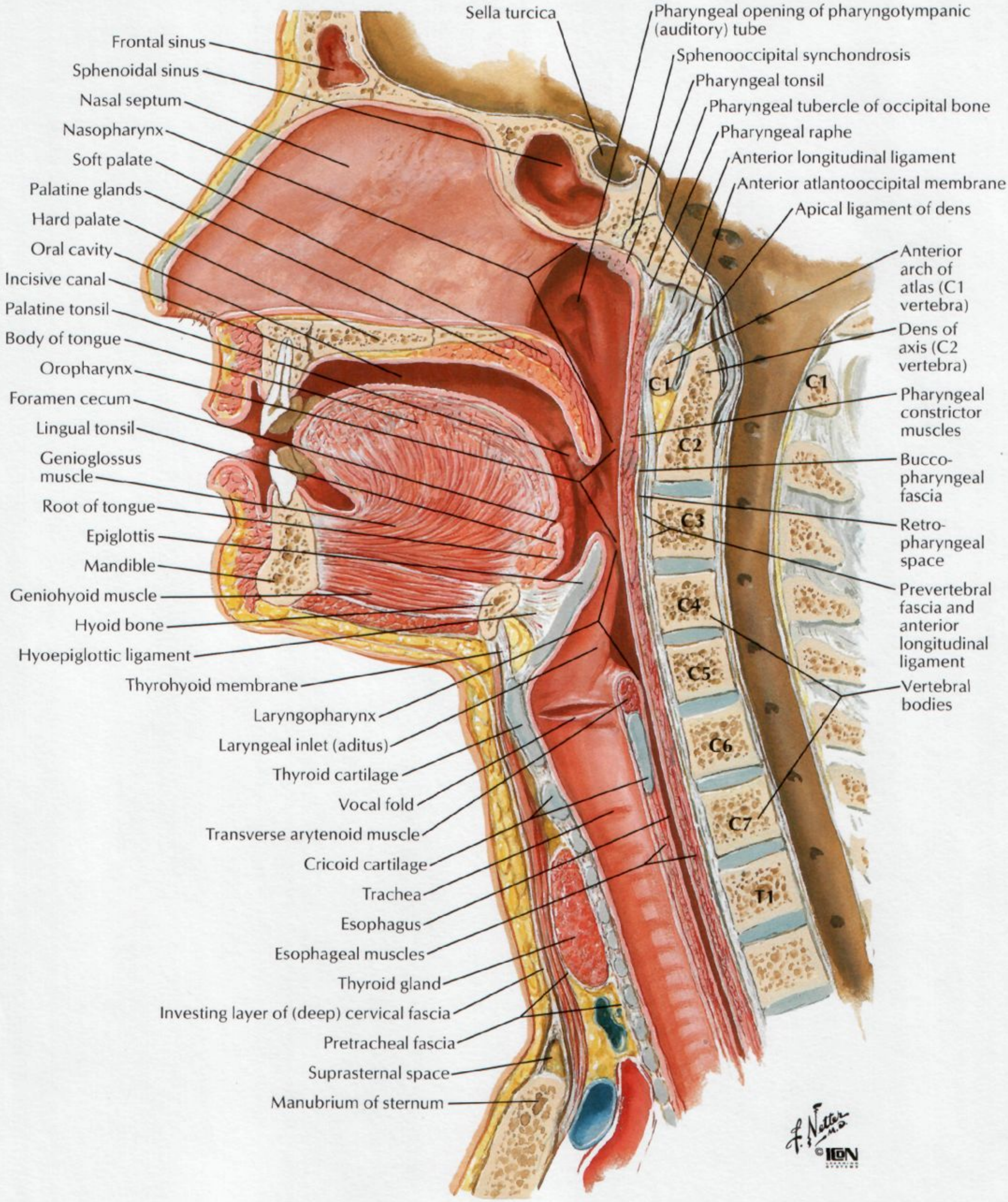
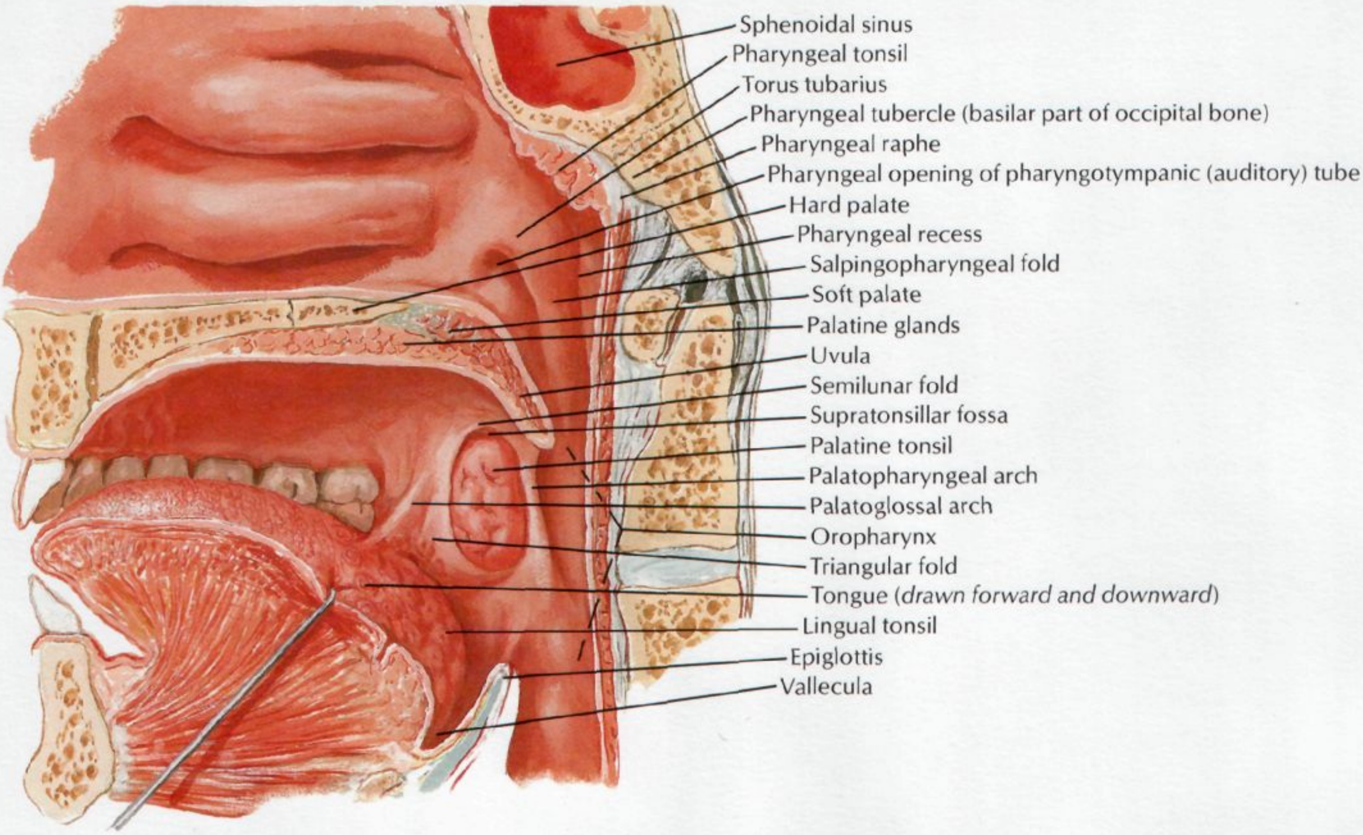
Pharynx: Median Section

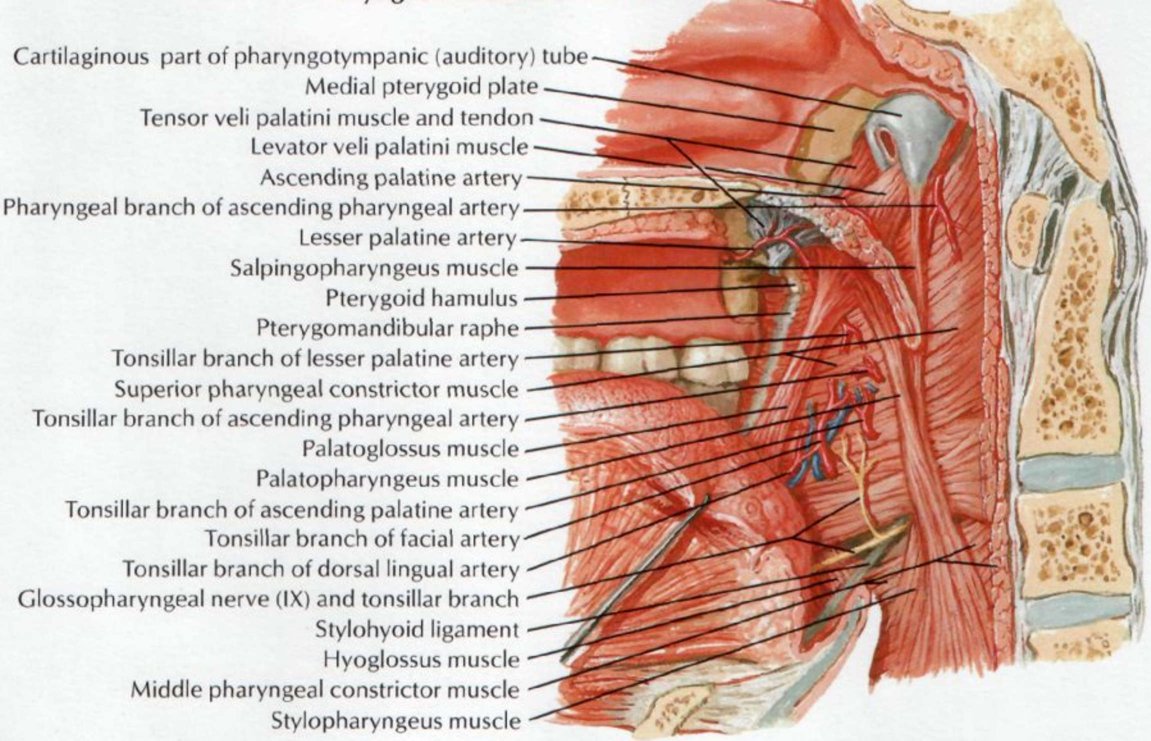


Fauces

Medial view
Median (sagittal) section



Pharyngeal mucosa removed


Cartilaginous part of pharyngotympanic (auditory) tube
Medial pterygoid plate
Tensor veli palatini muscle and tendon
Levator veli palatini muscle
Ascending palatine artery
Pharyngeal branch of ascending pharyngeal artery
Lesser palatine artery
Salpingopharyngeus muscle
Pterygoid hamulus
Pterygomandibular raphe
Tonsillar branch of lesser palatine artery
Superior pharyngeal constrictor muscle
Tonsillar branch of ascending pharyngeal artery
Palatoglossus muscle
Palatopharyngeus muscle
Tonsillar branch of ascending palatine artery
Tonsillar branch of facial artery
Tonsillar branch of dorsal lingual artery
Glossopharyngeal nerve (IX) and tonsillar branch
Stylohyoid ligament
Hyoglossus muscle
Middle pharyngeal constrictor muscle
Stylopharyngeus muscle

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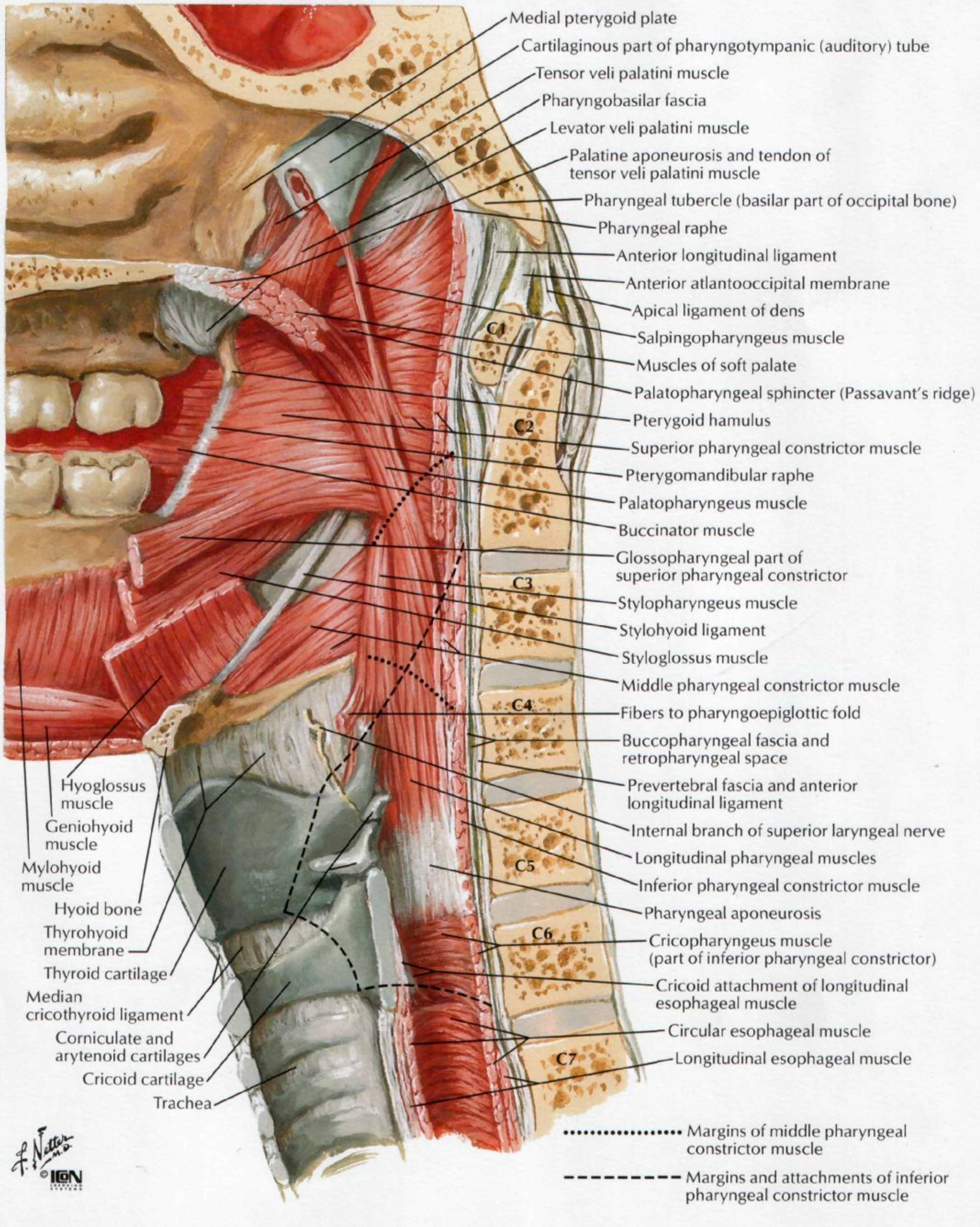
Muscles of Pharynx: Median (Sagittal) Section


Medial pterygoid plate
Cartilaginous part of pharyngotympanic (auditory) tube
Tensor veli palatini muscle
Pharyngobasilar fascia
Levator veli palatini muscle
Palatine aponeurosis and tendon of tensor veli palatini muscle
Pharyngeal tubercle (basilar part of occipital bone)
Pharyngeal raphe
Anterior longitudinal ligament
Anterior atlantooccipital membrane
Apical ligament of dens
Salpingopharyngeus muscle
Muscles of soft palate
Palatopharyngeal sphincter (Passavant's ridge)
Pterygoid hamulus
Superior pharyngeal constrictor muscle
Pterygomandibular raphe
Palatopharyngeus muscle
Buccinator muscle
Glossopharyngeal part of superior pharyngeal constrictor
Stylopharyngeus muscle
Stylohyoid ligament
Styloglossus muscle
Middle pharyngeal constrictor muscle
Fibers to pharyngoepiglottic fold
Buccopharyngeal fascia and retropharyngeal space
Prevertebral fascia and anterior longitudinal ligament
Internal branch of superior laryngeal nerve
Longitudinal pharyngeal muscles
Inferior pharyngeal constrictor muscle
Pharyngeal aponeurosis
Cricopharyngeus muscle (part of inferior pharyngeal constrictor)
Cricoid attachment of longitudinal esophageal muscle
Circular esophageal muscle
Longitudinal esophageal muscle
C1
C2
C3
C4
C5
C6
C7
Hyoglossus muscle
Geniohyoid muscle
Mylohyoid muscle
Hyoid bone
Thyrohyoid membrane
Thyroid cartilage
Median cricothyroid ligament
Corniculate and arytenoid cartilages
Cricoid cartilage
Trachea
F. Netter M.D.
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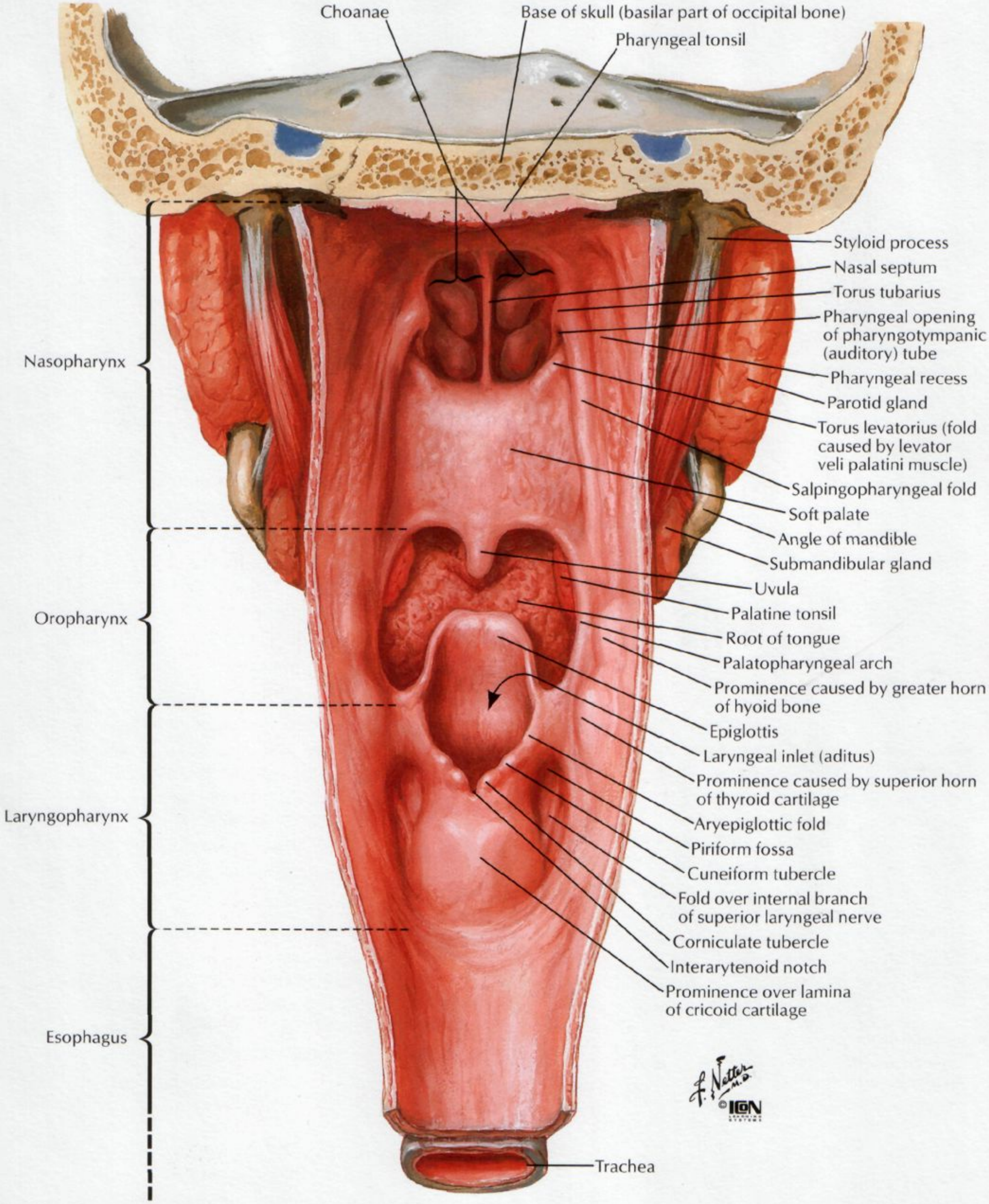
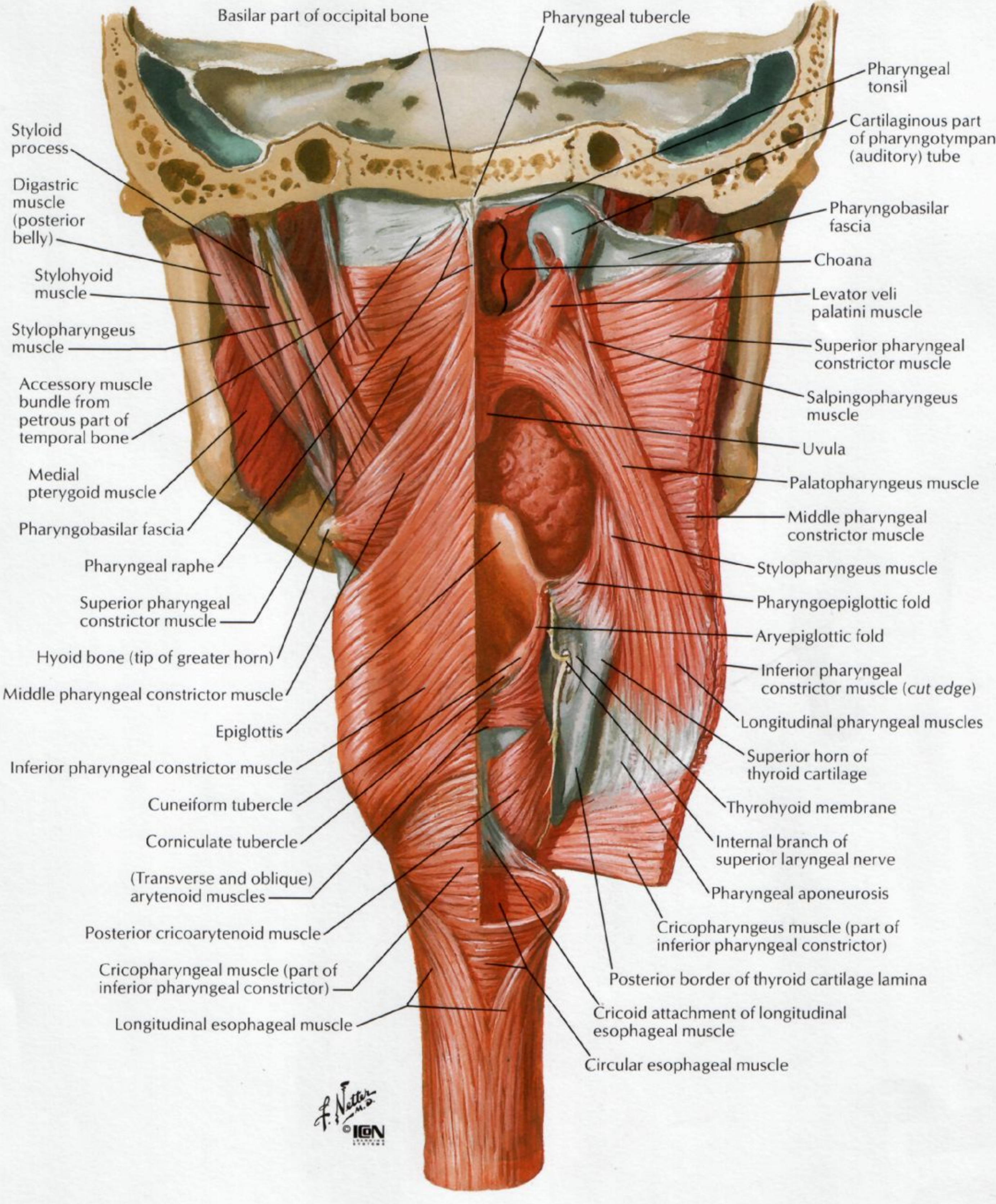
•••••••••••••••••• Margins of middle pharyngeal constrictor muscle
- - - - - - - - - Margins and attachments of inferior pharyngeal constrictor muscle

Pharynx: Opened Posterior View



Muscles of Pharynx: Partially Opened Posterior View

SEE ALSO PLATE 231


Basilar part of occipital bone
Pharyngeal tubercle
Styloid process
Digastric muscle (posterior belly)
Stylohyoid muscle
Stylopharyngeus muscle
Accessory muscle bundle from petrous part of temporal bone
Medial pterygoid muscle
Pharyngobasilar fascia
Pharyngeal raphe
Superior pharyngeal constrictor muscle
Hyoid bone (tip of greater horn)
Middle pharyngeal constrictor muscle
Epiglottis
Inferior pharyngeal constrictor muscle
Cuneiform tubercle
Corniculate tubercle
(Transverse and oblique) arytenoid muscles
Posterior cricoarytenoid muscle
Cricopharyngeal muscle (part of inferior pharyngeal constrictor)
Longitudinal esophageal muscle
Pharyngeal tonsil
Cartilaginous part of pharyngotympanic (auditory) tube
Pharyngobasilar fascia
Choana
Levator veli palatini muscle
Superior pharyngeal constrictor muscle
Salpingopharyngeus muscle
Uvula
Palatopharyngeus muscle
Middle pharyngeal constrictor muscle
Stylopharyngeus muscle
Pharyngoepiglottic fold
Aryepiglottic fold
Inferior pharyngeal constrictor muscle (*cut edge*)
Longitudinal pharyngeal muscles
Superior horn of thyroid cartilage
Thyrohyoid membrane
Internal branch of superior laryngeal nerve
Pharyngeal aponeurosis
Cricopharyngeus muscle (part of inferior pharyngeal constrictor)
Posterior border of thyroid cartilage lamina
Cricoid attachment of longitudinal esophageal muscle
Circular esophageal muscle
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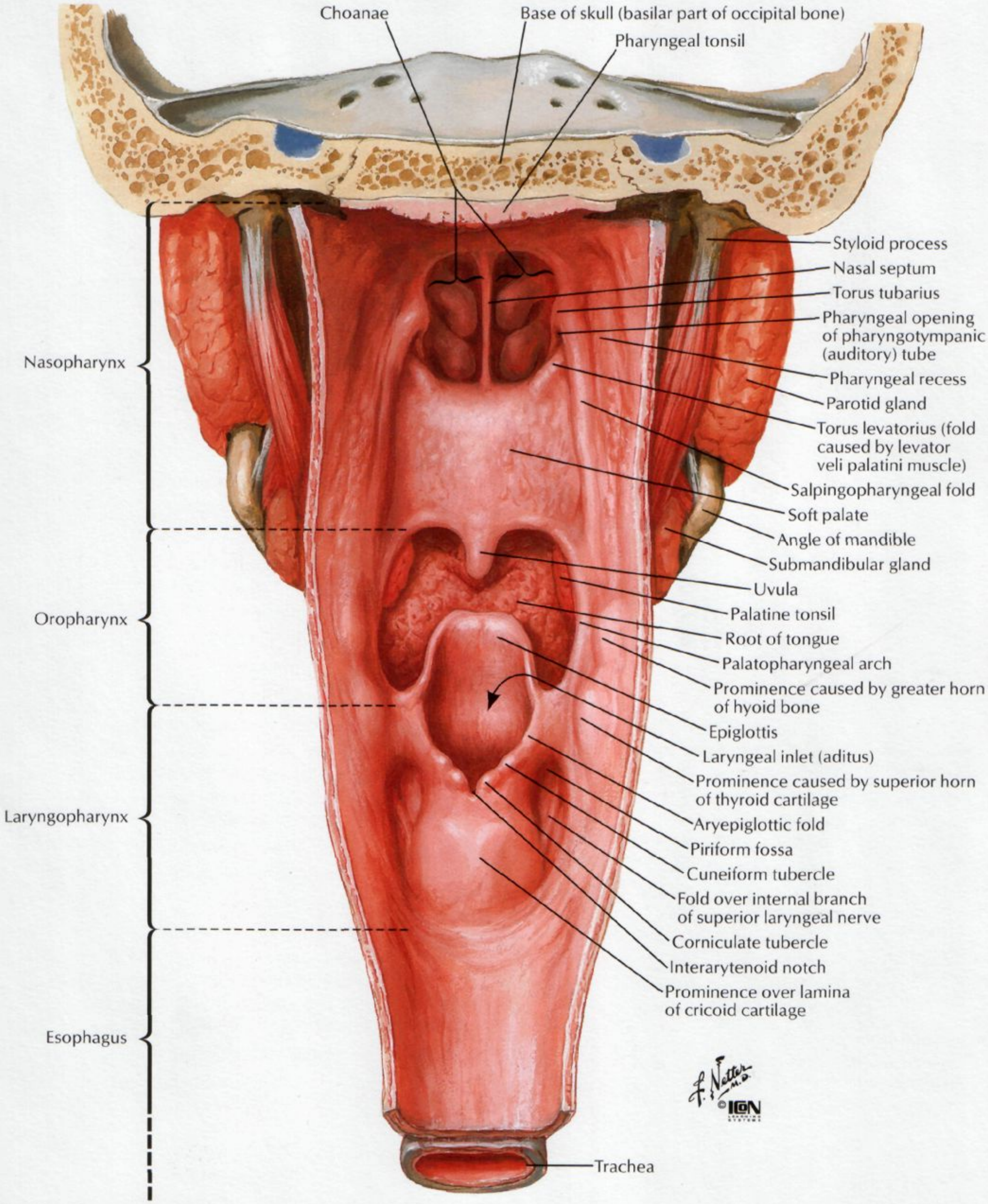
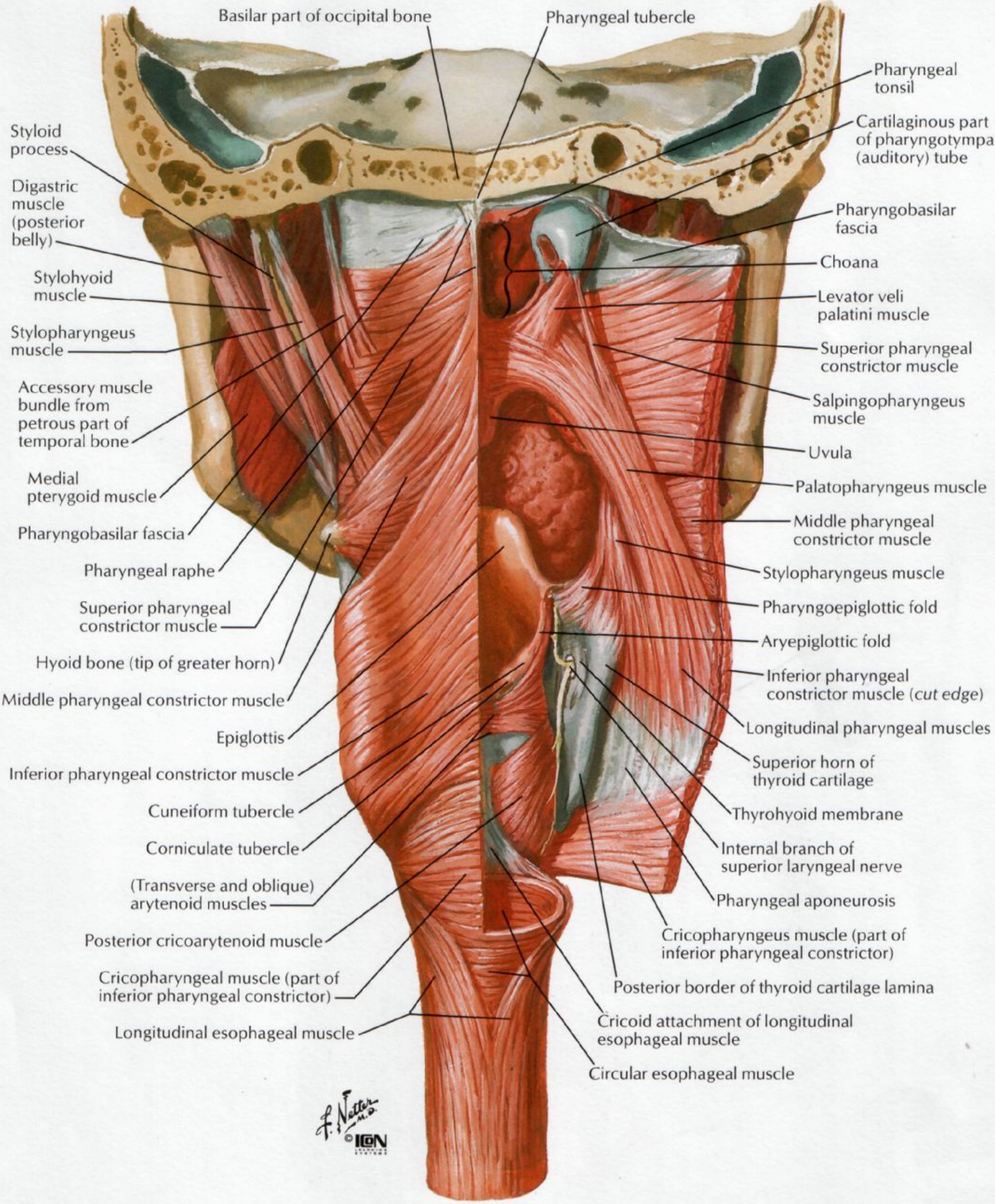
Pharynx: Opened Posterior View



Muscles of Pharynx: Partially Opened Posterior View

SEE ALSO PLATE 231



Basilar part of occipital bone
Pharyngeal tubercle
Pharyngeal tonsil
Cartilaginous part of pharyngotympanic (auditory) tube
Pharyngobasilar fascia
Choana
Levator veli palatini muscle
Superior pharyngeal constrictor muscle
Salpingopharyngeus muscle
Uvula
Palatopharyngeus muscle
Middle pharyngeal constrictor muscle
Stylopharyngeus muscle
Pharyngoepiglottic fold
Aryepiglottic fold
Inferior pharyngeal constrictor muscle (*cut edge*)
Longitudinal pharyngeal muscles
Superior horn of thyroid cartilage
Thyrohyoid membrane
Internal branch of superior laryngeal nerve
Pharyngeal aponeurosis
Cricopharyngeus muscle (part of inferior pharyngeal constrictor)
Posterior border of thyroid cartilage lamina
Cricoid attachment of longitudinal esophageal muscle
Circular esophageal muscle
Styloid process
Digastric muscle (posterior belly)
Stylohyoid muscle
Stylopharyngeus muscle
Accessory muscle bundle from petrous part of temporal bone
Medial pterygoid muscle
Pharyngobasilar fascia
Pharyngeal raphe
Superior pharyngeal constrictor muscle
Hyoid bone (tip of greater horn)
Middle pharyngeal constrictor muscle
Epiglottis
Inferior pharyngeal constrictor muscle
Cuneiform tubercle
Corniculate tubercle
(Transverse and oblique) arytenoid muscles
Posterior cricoarytenoid muscle
Cricopharyngeal muscle (part of inferior pharyngeal constrictor)
Longitudinal esophageal muscle
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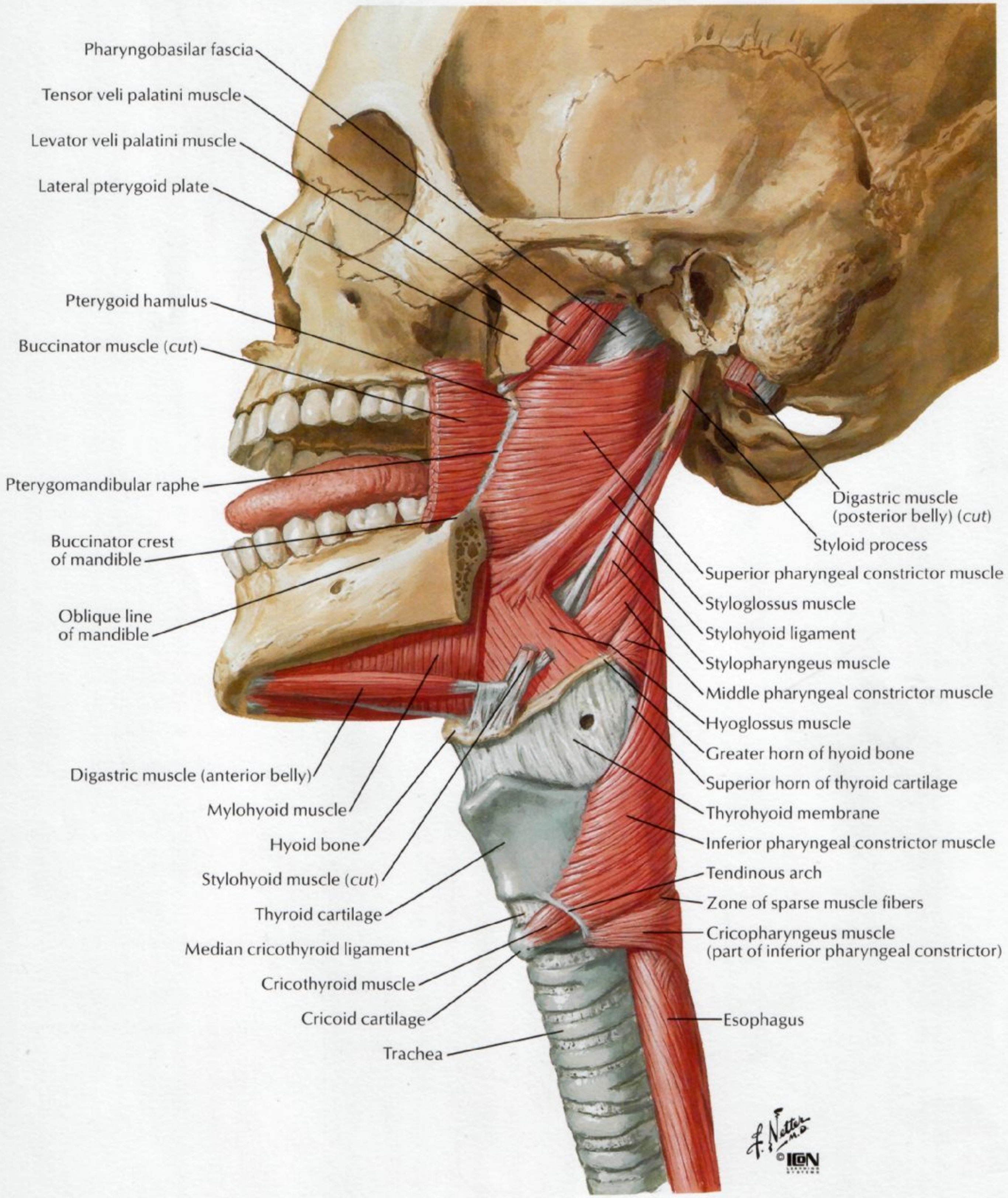
Muscles of Pharynx: Lateral View


Pharyngobasilar fascia
Tensor veli palatini muscle
Levator veli palatini muscle
Lateral pterygoid plate
Pterygoid hamulus
Buccinator muscle (*cut*)
Pterygomandibular raphe
Buccinator crest of mandible
Oblique line of mandible
Digastric muscle (anterior belly)
Mylohyoid muscle
Hyoid bone
Stylohyoid muscle (*cut*)
Thyroid cartilage
Median cricothyroid ligament
Cricothyroid muscle
Cricoid cartilage
Trachea
Digastric muscle (posterior belly) (*cut*)
Styloid process
Superior pharyngeal constrictor muscle
Styloglossus muscle
Stylohyoid ligament
Stylopharyngeus muscle
Middle pharyngeal constrictor muscle
Hyoglossus muscle
Greater horn of hyoid bone
Superior horn of thyroid cartilage
Thyrohyoid membrane
Inferior pharyngeal constrictor muscle
Tendinous arch
Zone of sparse muscle fibers
Cricopharyngeus muscle (part of inferior pharyngeal constrictor)
Esophagus
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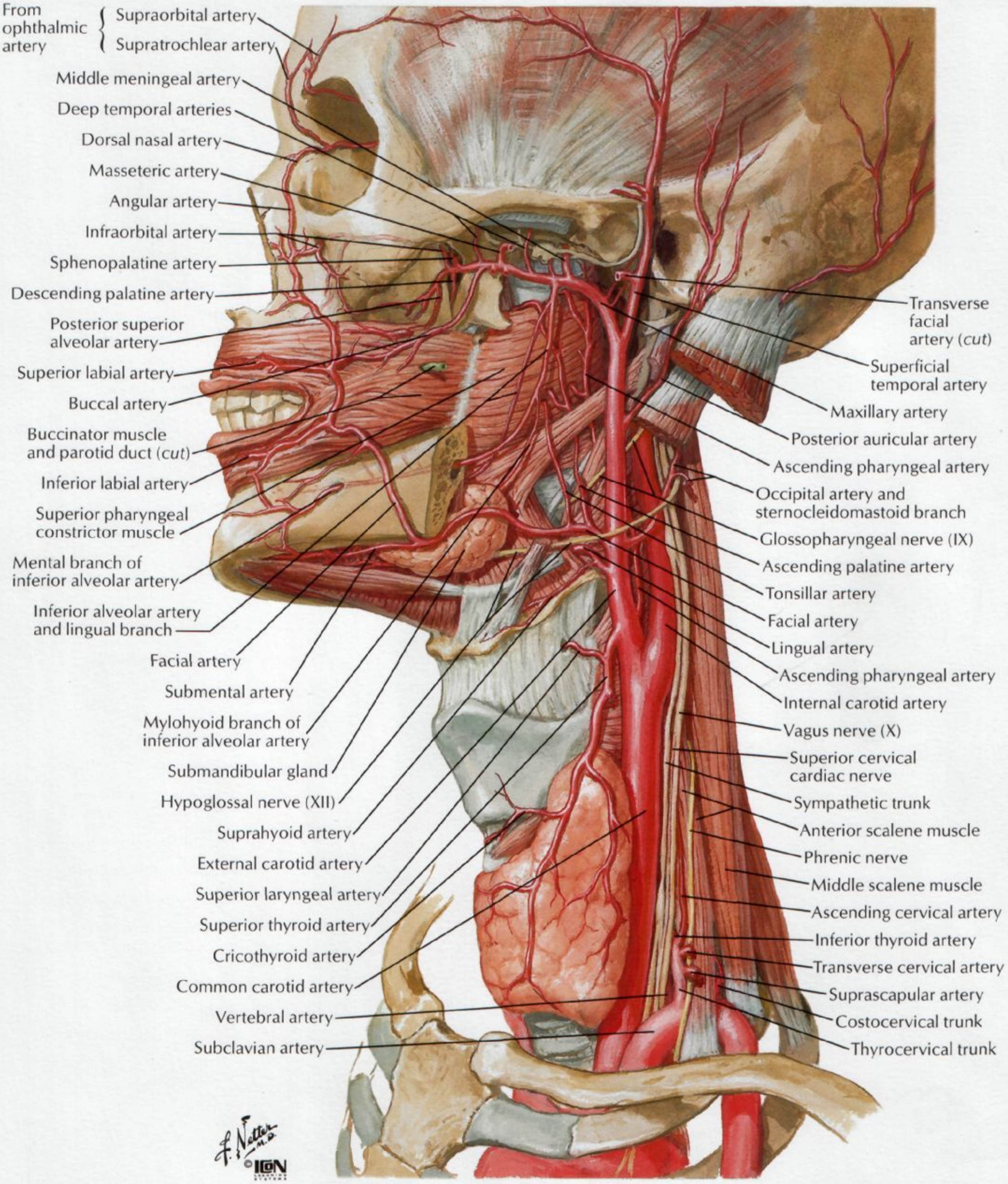
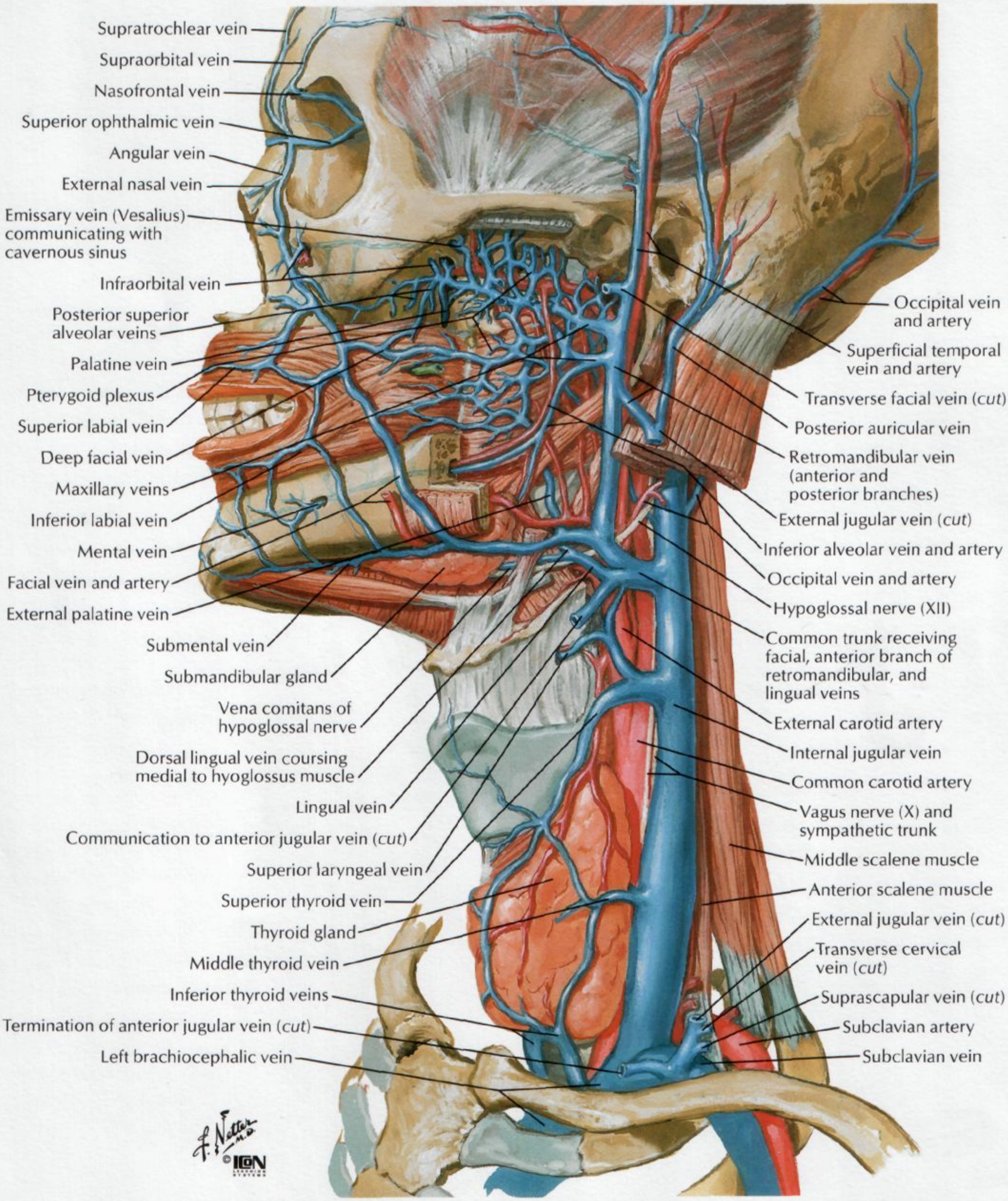
Arteries of Oral and Pharyngeal Regions

SEE ALSO PLATES 30, 36



Veins of Oral and Pharyngeal Regions

SEE ALSO PLATES 19, 27, 98


Supratrochlear vein
Supraorbital vein
Nasofrontal vein
Superior ophthalmic vein
Angular vein
External nasal vein
Emissary vein (Vesalius) communicating with cavernous sinus
Infraorbital vein
Posterior superior alveolar veins
Palatine vein
Pterygoid plexus
Superior labial vein
Deep facial vein
Maxillary veins
Inferior labial vein
Mental vein
Facial vein and artery
External palatine vein
Submental vein
Submandibular gland
Vena comitans of hypoglossal nerve
Dorsal lingual vein coursing medial to hyoglossus muscle
Lingual vein
Communication to anterior jugular vein (*cut*)
Superior laryngeal vein
Superior thyroid vein
Thyroid gland
Middle thyroid vein
Inferior thyroid veins
Termination of anterior jugular vein (*cut*)
Left brachiocephalic vein
Occipital vein and artery
Superficial temporal vein and artery
Transverse facial vein (*cut*)
Posterior auricular vein
Retromandibular vein (anterior and posterior branches)
External jugular vein (*cut*)
Inferior alveolar vein and artery
Occipital vein and artery
Hypoglossal nerve (XII)
Common trunk receiving facial, anterior branch of retromandibular, and lingual veins
External carotid artery
Internal jugular vein
Common carotid artery
Vagus nerve (X) and sympathetic trunk
Middle scalene muscle
Anterior scalene muscle
External jugular vein (*cut*)
Transverse cervical vein (*cut*)
Suprascapular vein (*cut*)
Subclavian artery
Subclavian vein
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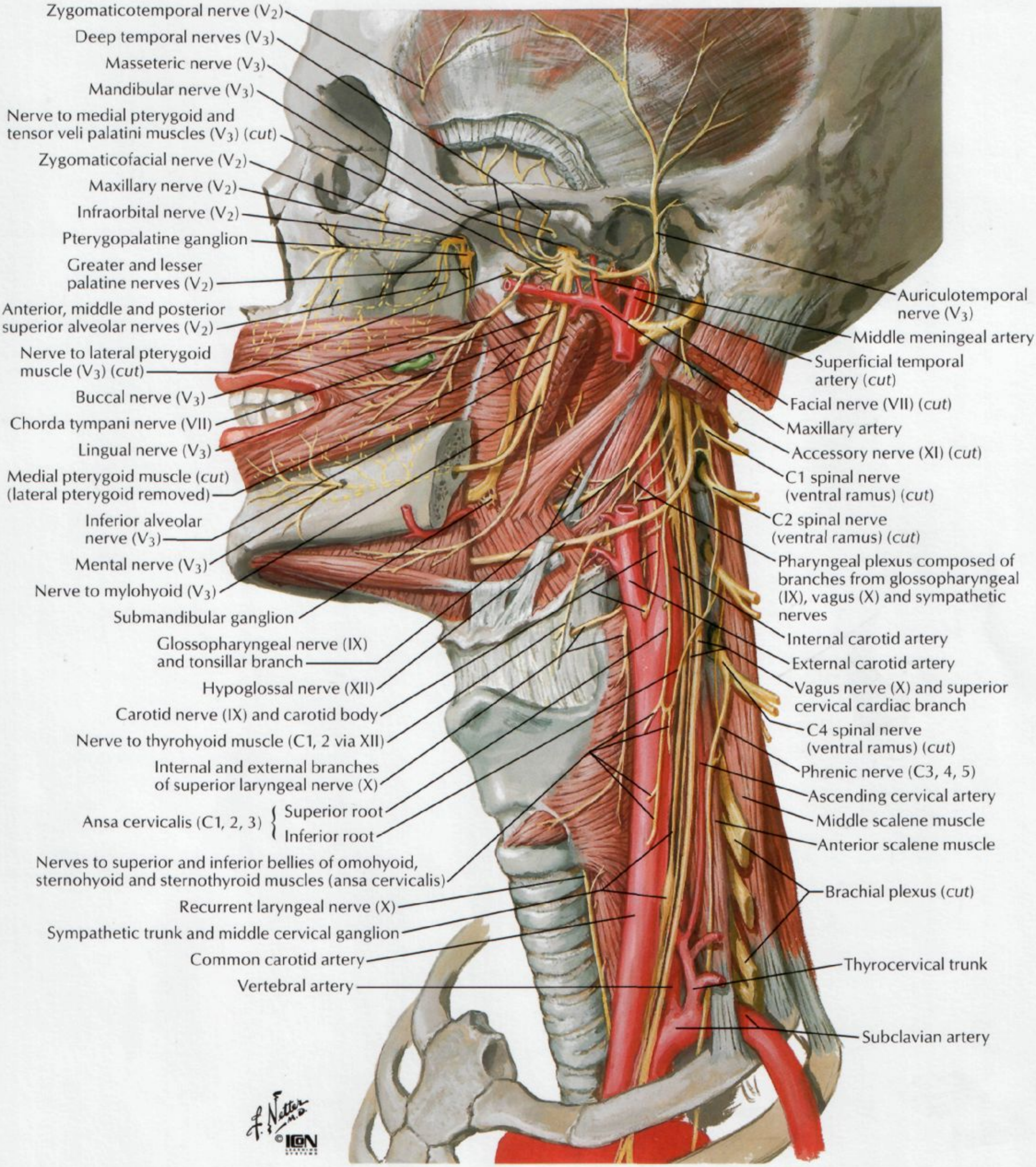
Nerves of Oral and Pharyngeal Regions

SEE ALSO PLATES 21, 41, 42, 116, 119, 120


Zygomaticotemporal nerve (V2)
Deep temporal nerves (V3)
Masseteric nerve (V3)
Mandibular nerve (V3)
Nerve to medial pterygoid and tensor veli palatini muscles (V3) (cut)
Zygomaticofacial nerve (V2)
Maxillary nerve (V2)
Infraorbital nerve (V2)
Pterygopalatine ganglion
Greater and lesser palatine nerves (V2)
Anterior, middle and posterior superior alveolar nerves (V2)
Nerve to lateral pterygoid muscle (V3) (cut)
Buccal nerve (V3)
Chorda tympani nerve (VII)
Lingual nerve (V3)
Medial pterygoid muscle (cut) (lateral pterygoid removed)
Inferior alveolar nerve (V3)
Mental nerve (V3)
Nerve to mylohyoid (V3)
Submandibular ganglion
Glossopharyngeal nerve (IX) and tonsillar branch
Hypoglossal nerve (XII)
Carotid nerve (IX) and carotid body
Nerve to thyrohyoid muscle (C1, 2 via XII)
Internal and external branches of superior laryngeal nerve (X)
Ansa cervicalis (C1, 2, 3) Superior root
Inferior root
Nerves to superior and inferior bellies of omohyoid, sternohyoid and sternothyroid muscles (ansa cervicalis)
Recurrent laryngeal nerve (X)
Sympathetic trunk and middle cervical ganglion
Common carotid artery
Vertebral artery
Auriculotemporal nerve (V3)
Middle meningeal artery
Superficial temporal artery (cut)
Facial nerve (VII) (cut)
Maxillary artery
Accessory nerve (XI) (cut)
C1 spinal nerve (ventral ramus) (cut)
C2 spinal nerve (ventral ramus) (cut)
Pharyngeal plexus composed of branches from glossopharyngeal (IX), vagus (X) and sympathetic nerves
Internal carotid artery
External carotid artery
Vagus nerve (X) and superior cervical cardiac branch
C4 spinal nerve (ventral ramus) (cut)
Phrenic nerve (C3, 4, 5)
Ascending cervical artery
Middle scalene muscle
Anterior scalene muscle
Brachial plexus (cut)
Thyrocervical trunk
Subclavian artery
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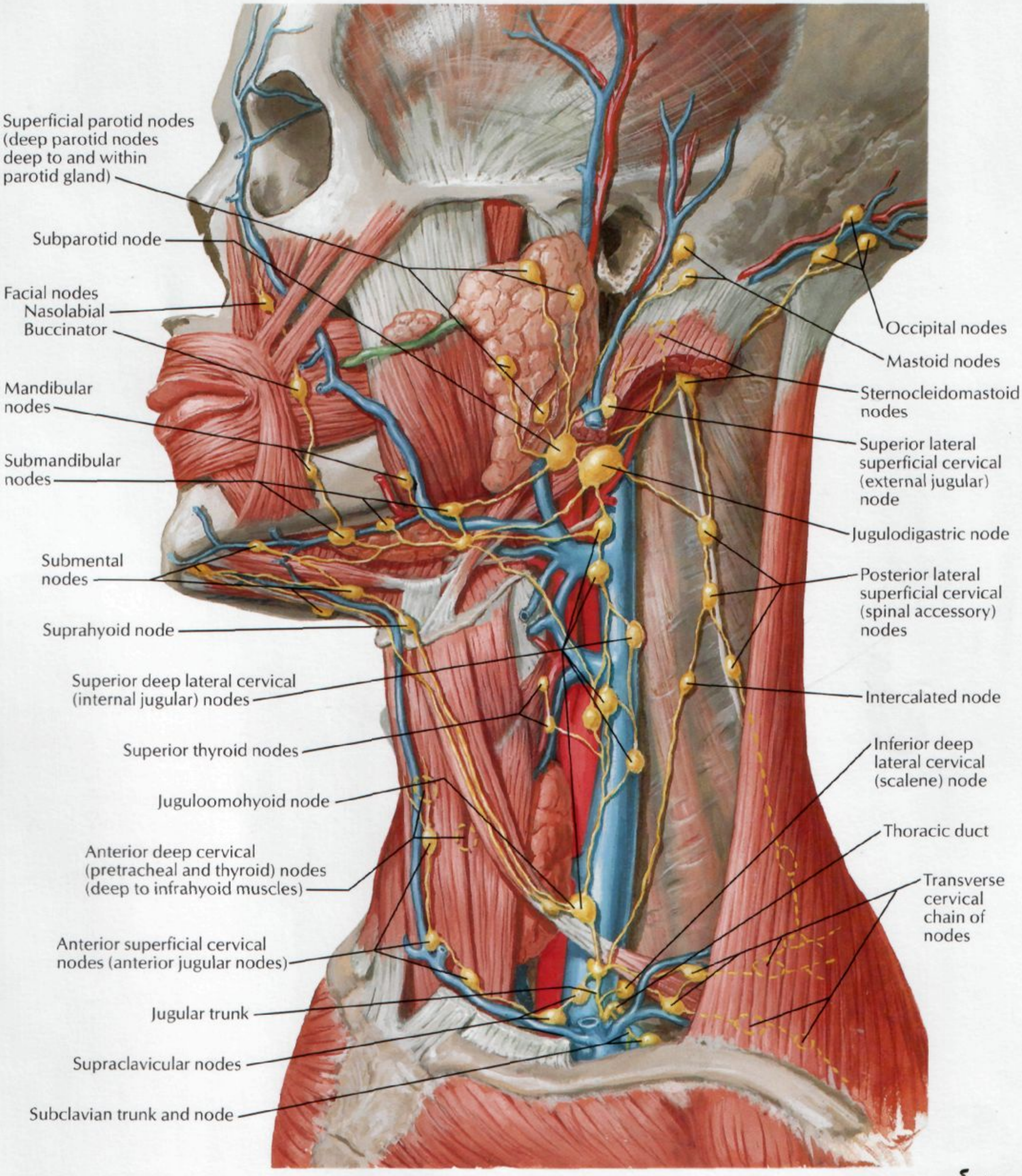
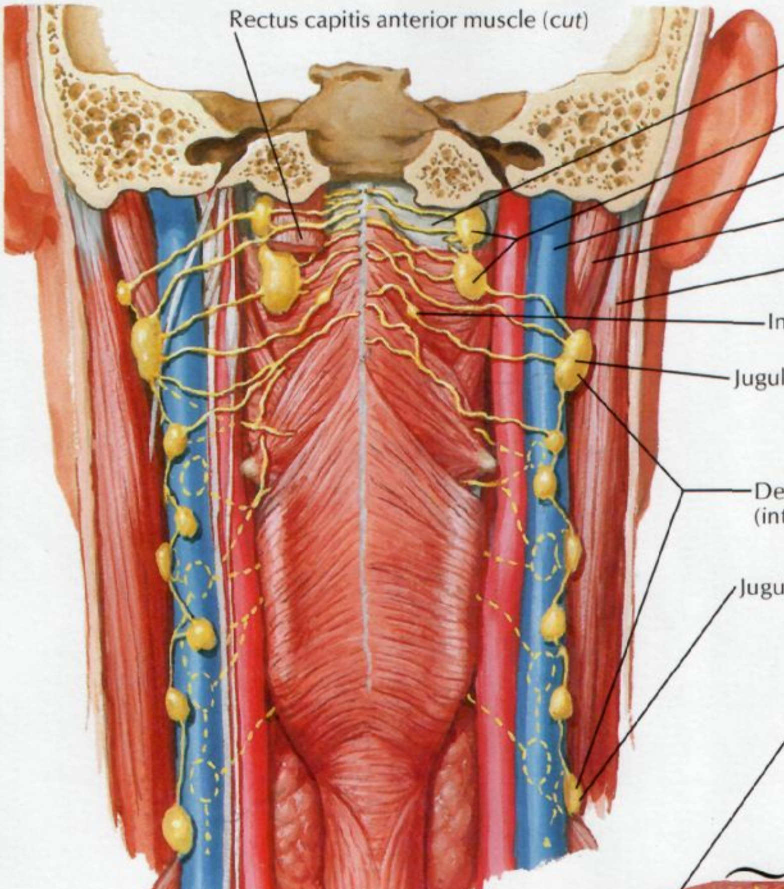
Lymph Vessels and Nodes of Head and Neck

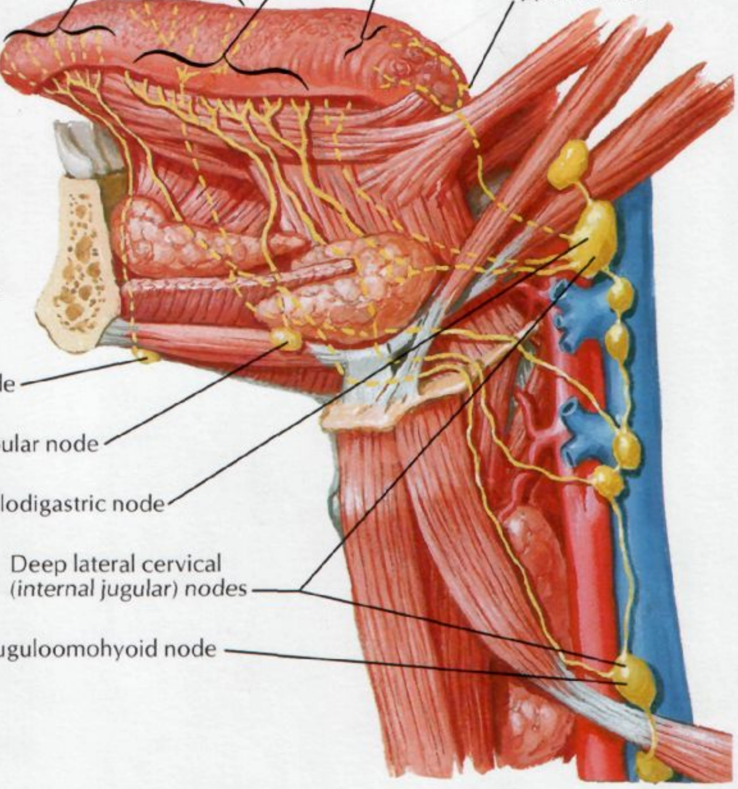
SEE ALSO PLATE 204


Superficial parotid nodes (deep parotid nodes deep to and within parotid gland)
Subparotid node
Facial nodes
Nasolabial
Buccinator
Mandibular nodes
Submandibular nodes
Submental nodes
Suprahyoid node
Superior deep lateral cervical (internal jugular) nodes
Superior thyroid nodes
Juguloomohyoid node
Anterior deep cervical (pretracheal and thyroid) nodes (deep to infrahyoid muscles)
Anterior superficial cervical nodes (anterior jugular nodes)
Jugular trunk
Supraclavicular nodes
Subclavian trunk and node
Occipital nodes
Mastoid nodes
Sternocleidomastoid nodes
Superior lateral superficial cervical (external jugular) node
Jugulodigastric node
Posterior lateral superficial cervical (spinal accessory) nodes
Intercalated node
Inferior deep lateral cervical (scalene) node
Thoracic duct
Transverse cervical chain of nodes

Lymph Vessels and Nodes of Pharynx and Tongue


Rectus capitis anterior muscle (*cut*)
Pharyngobasilar fascia
Retropharyngeal nodes
Internal jugular vein
Digastric muscle (posterior belly)
Sternocleidomastoid muscle
Intercalated node
Jugulodigastric node
Deep lateral cervical (internal jugular) nodes
Juguloomohyoid node

Lymphatic drainage of pharynx: posterior view


Apical collecting vessels
Central collecting vessels
Marginal collecting vessels
Basal collecting vessels
Communication to opposite side
Submental node
Submandibular node
Jugulodigastric node
Deep lateral cervical (internal jugular) nodes
Juguloomohyoid node

Lymphatic drainage of tongue

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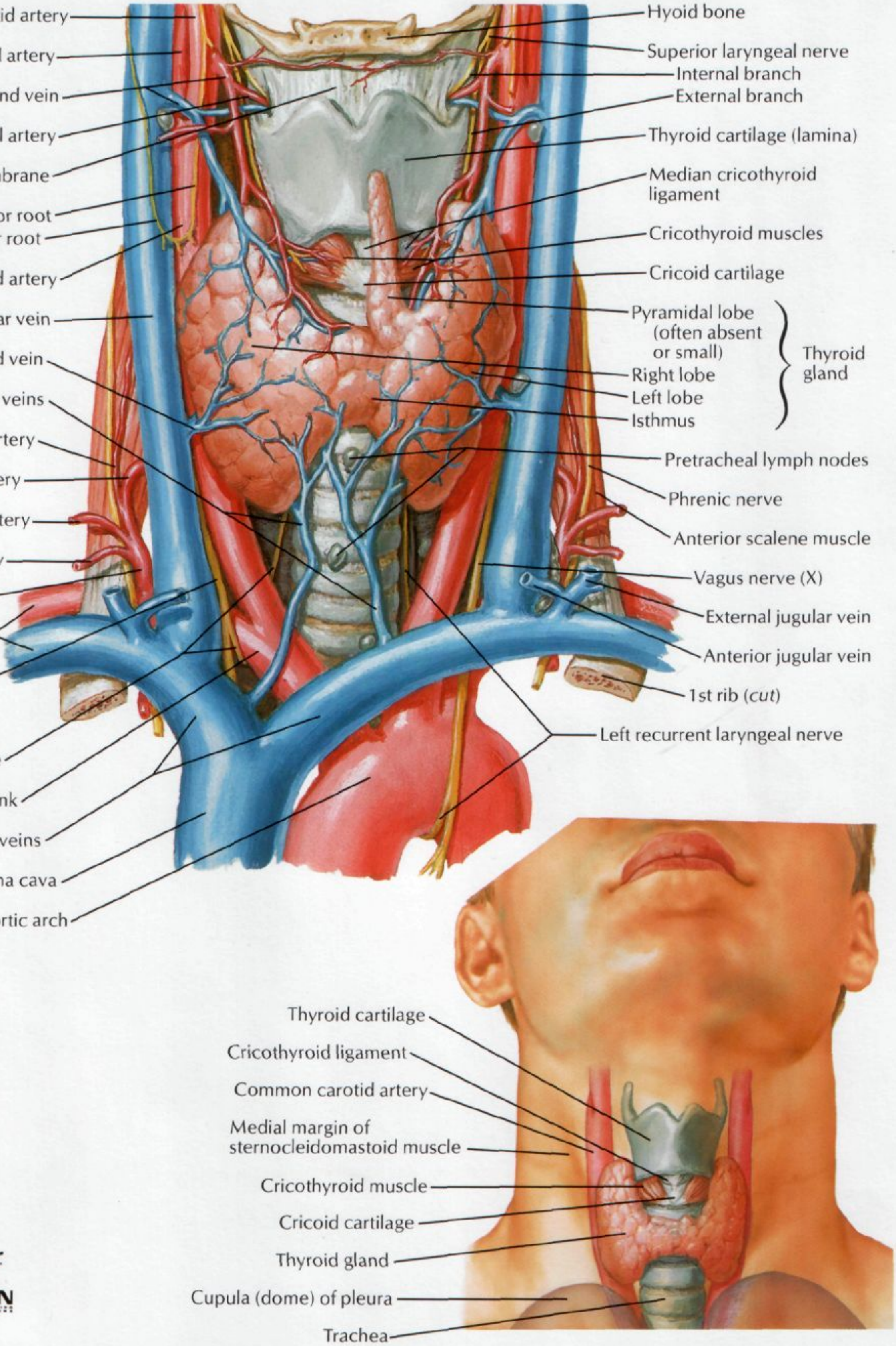
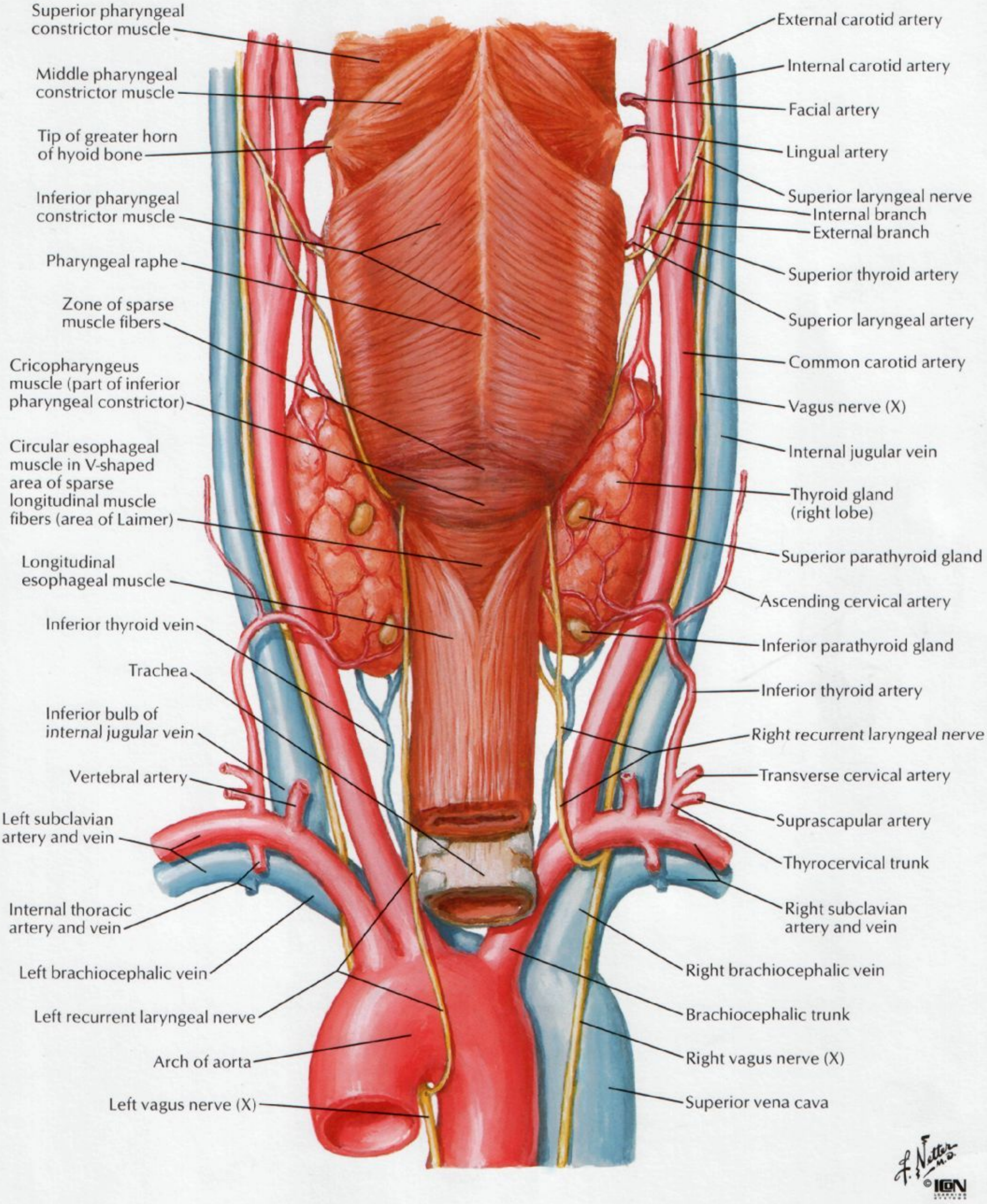
Thyroid Gland: Anterior View



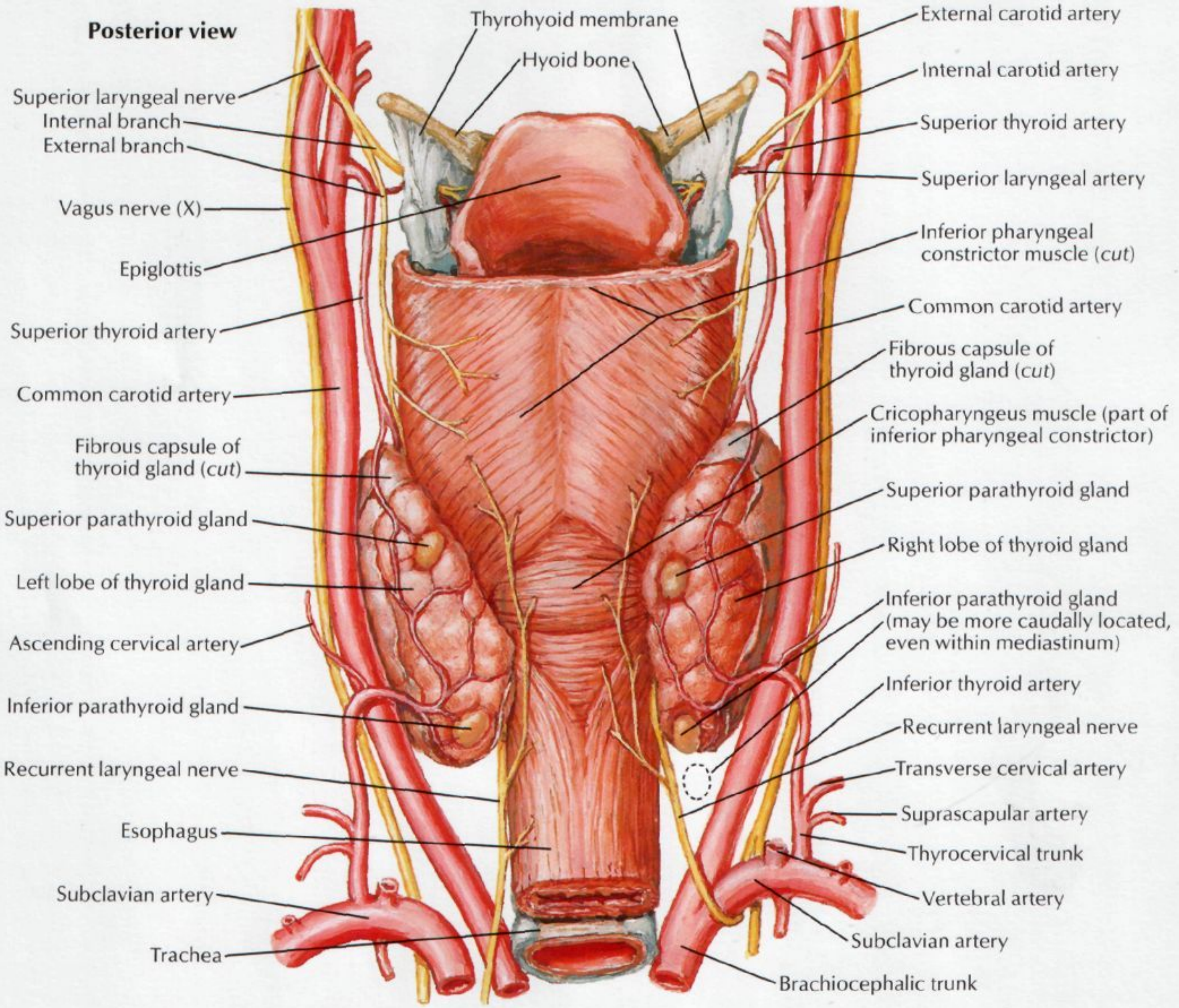
Thyroid Gland and Pharynx: Posterior View


Superior pharyngeal constrictor muscle
Middle pharyngeal constrictor muscle
Tip of greater horn of hyoid bone
Inferior pharyngeal constrictor muscle
Pharyngeal raphe
Zone of sparse muscle fibers
Cricopharyngeus muscle (part of inferior pharyngeal constrictor)
Circular esophageal muscle in V-shaped area of sparse longitudinal muscle fibers (area of Laimer)
Longitudinal esophageal muscle
Inferior thyroid vein
Trachea
Inferior bulb of internal jugular vein
Vertebral artery
Left subclavian artery and vein
Internal thoracic artery and vein
Left brachiocephalic vein
Left recurrent laryngeal nerve
Arch of aorta
Left vagus nerve (X)
External carotid artery
Internal carotid artery
Facial artery
Lingual artery
Superior laryngeal nerve
Internal branch
External branch
Superior thyroid artery
Superior laryngeal artery
Common carotid artery
Vagus nerve (X)
Internal jugular vein
Thyroid gland (right lobe)
Superior parathyroid gland
Ascending cervical artery
Inferior parathyroid gland
Inferior thyroid artery
Right recurrent laryngeal nerve
Transverse cervical artery
Suprascapular artery
Thyrocervical trunk
Right subclavian artery and vein
Right brachiocephalic vein
Brachiocephalic trunk
Right vagus nerve (X)
Superior vena cava

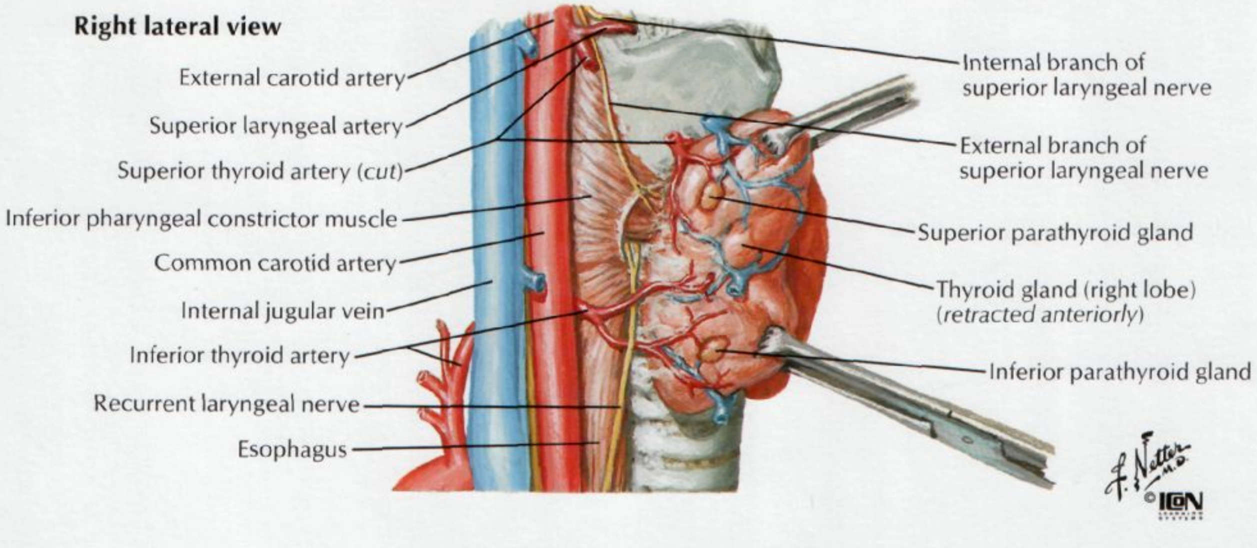
Parathyroid Glands

SEE ALSO PLATE 76

Posterior view


Thyrohyoid membrane
Hyoid bone
External carotid artery
Internal carotid artery
Superior laryngeal nerve
Internal branch
External branch
Superior thyroid artery
Superior laryngeal artery
Vagus nerve (X)
Inferior pharyngeal constrictor muscle (*cut*)
Epiglottis
Common carotid artery
Superior thyroid artery
Fibrous capsule of thyroid gland (*cut*)
Common carotid artery
Cricopharyngeus muscle (part of inferior pharyngeal constrictor)
Fibrous capsule of thyroid gland (*cut*)
Superior parathyroid gland
Superior parathyroid gland
Right lobe of thyroid gland
Left lobe of thyroid gland
Inferior parathyroid gland (may be more caudally located, even within mediastinum)
Ascending cervical artery
Inferior thyroid artery
Inferior parathyroid gland
Recurrent laryngeal nerve
Recurrent laryngeal nerve
Transverse cervical artery
Suprascapular artery
Esophagus
Thyrocervical trunk
Subclavian artery
Vertebral artery
Subclavian artery
Trachea
Brachiocephalic trunk

Right lateral view


Internal branch of superior laryngeal nerve
External carotid artery
Superior laryngeal artery
Superior thyroid artery (*cut*)
External branch of superior laryngeal nerve
Inferior pharyngeal constrictor muscle
Superior parathyroid gland
Common carotid artery
Thyroid gland (right lobe) (*retracted anteriorly*)
Internal jugular vein
Inferior thyroid artery
Inferior parathyroid gland
Recurrent laryngeal nerve
Esophagus
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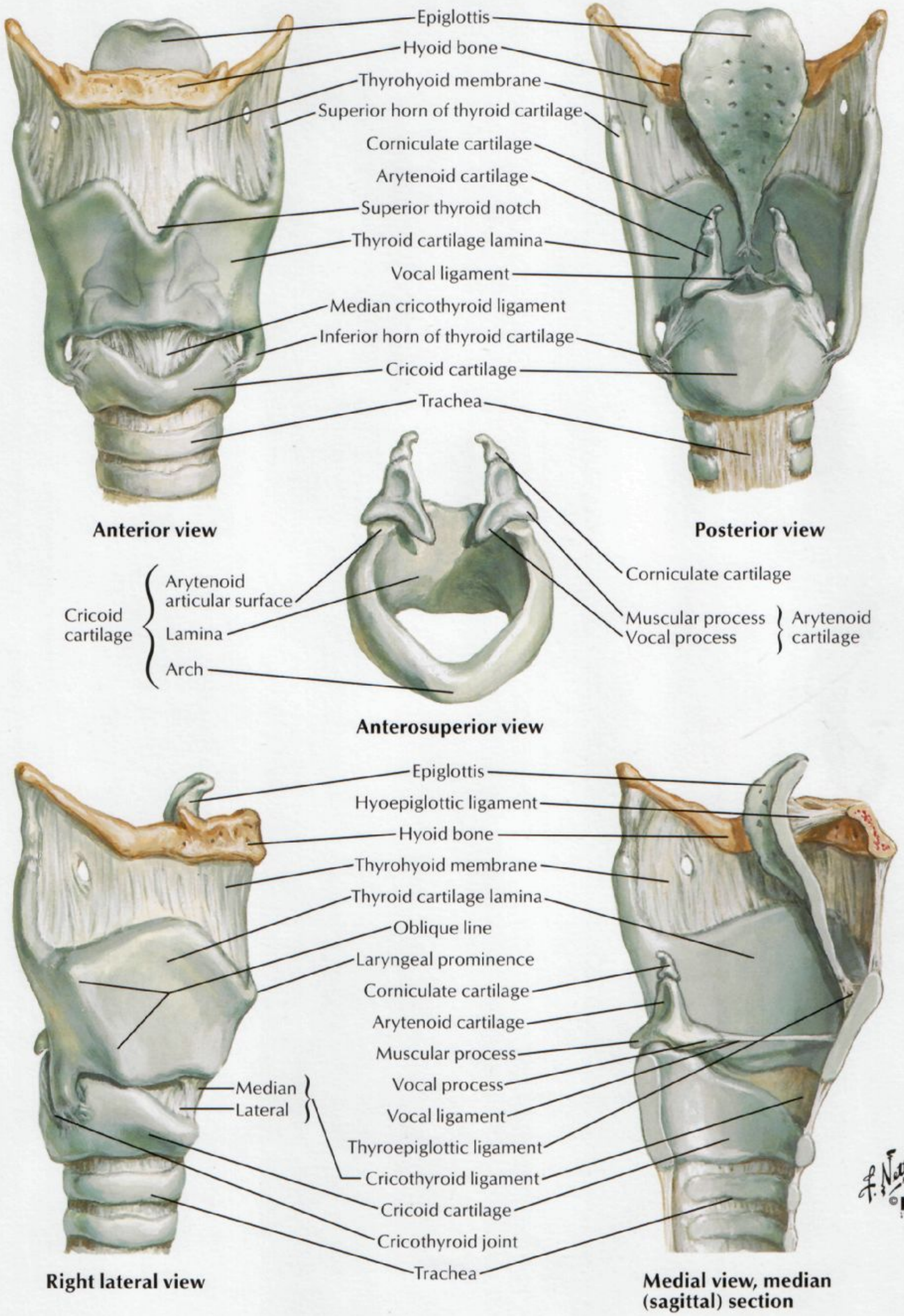


Anterior view

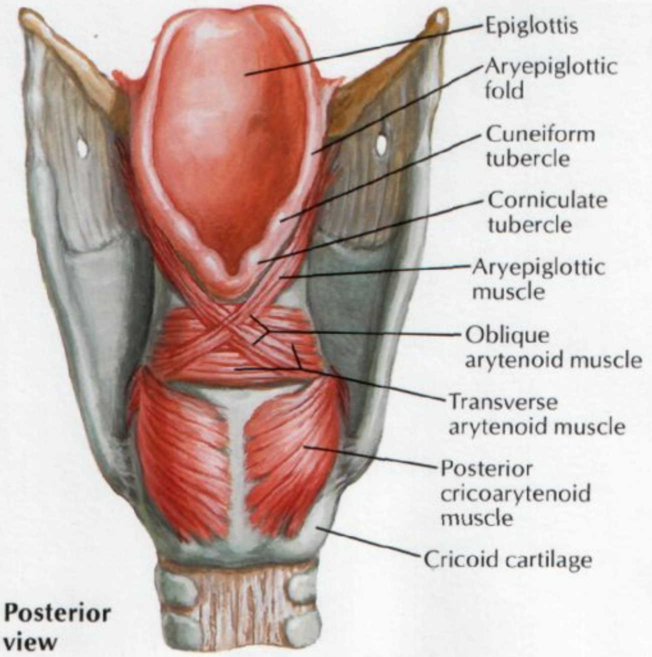
Posterior view

Anterosuperior view

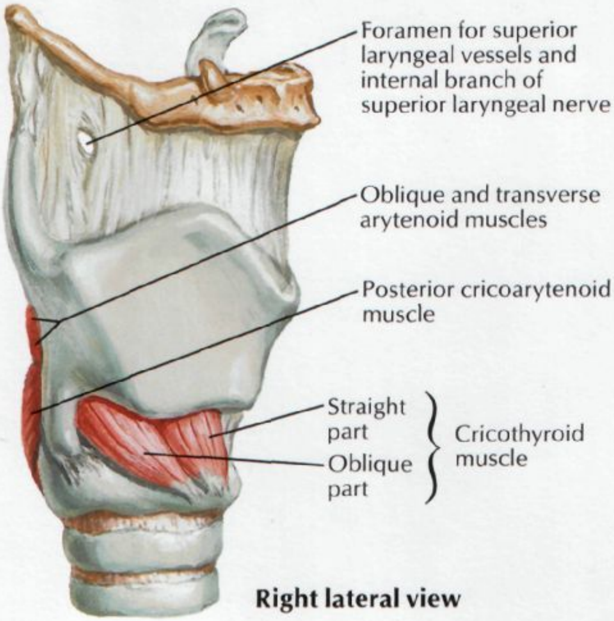
Right lateral view

Medial view, median (sagittal) section

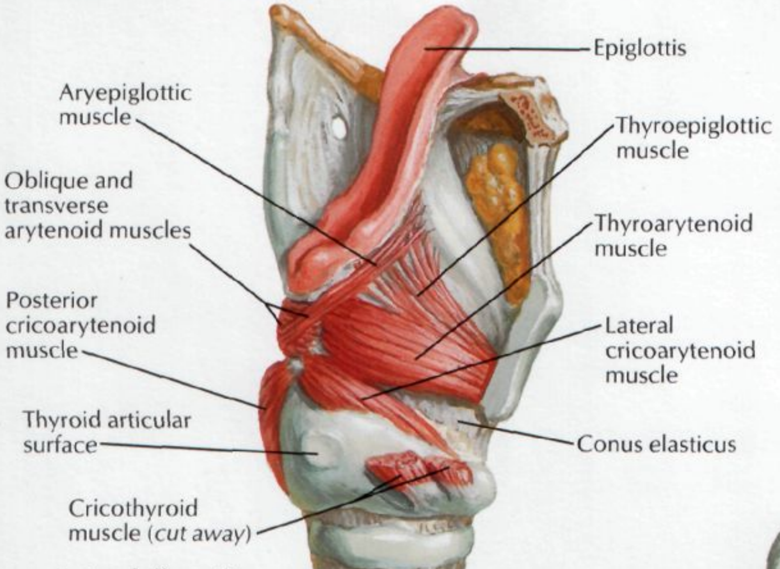
Intrinsic Muscles of Larynx



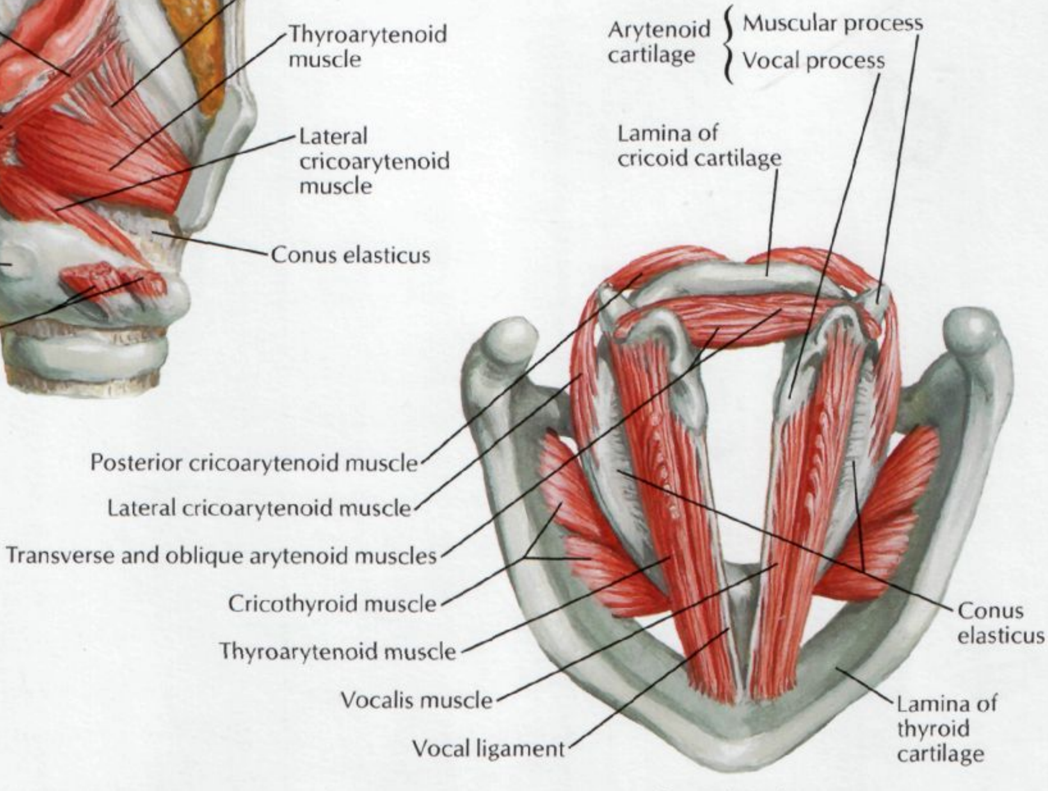
Posterior view


Foramen for superior laryngeal vessels and internal branch of superior laryngeal nerve
Oblique and transverse arytenoid muscles
Posterior cricoarytenoid muscle
Straight part
Oblique part
Cricothyroid muscle

Right lateral view


Epiglottis
Aryepiglottic muscle
Thyroepiglottic muscle
Oblique and transverse arytenoid muscles
Thyroarytenoid muscle
Posterior cricoarytenoid muscle
Lateral cricoarytenoid muscle
Thyroid articular surface
Conus elasticus
Cricothyroid muscle (*cut away*)

Lateral dissection


Arytenoid cartilage
Muscular process
Vocal process
Lamina of cricoid cartilage
Posterior cricoarytenoid muscle
Lateral cricoarytenoid muscle
Transverse and oblique arytenoid muscles
Cricothyroid muscle
Thyroarytenoid muscle
Vocalis muscle
Vocal ligament
Conus elasticus
Lamina of thyroid cartilage

Superior view

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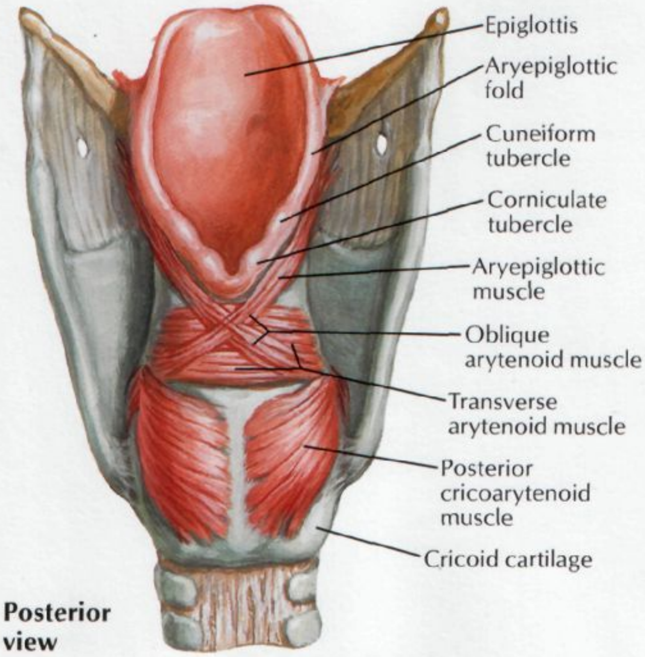
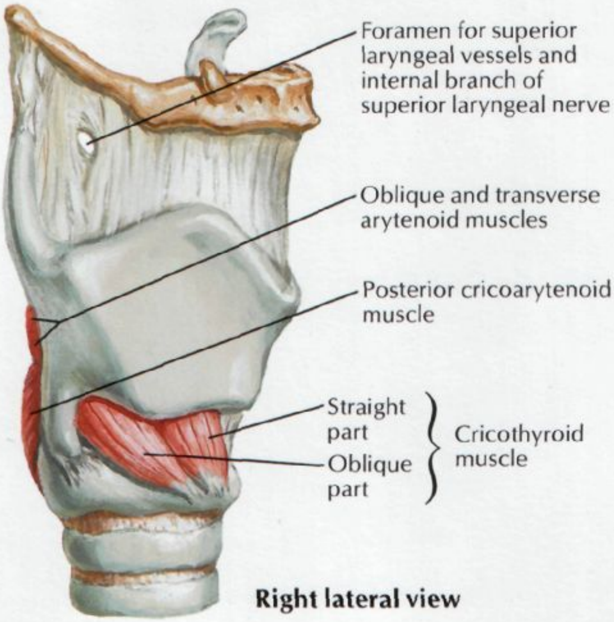
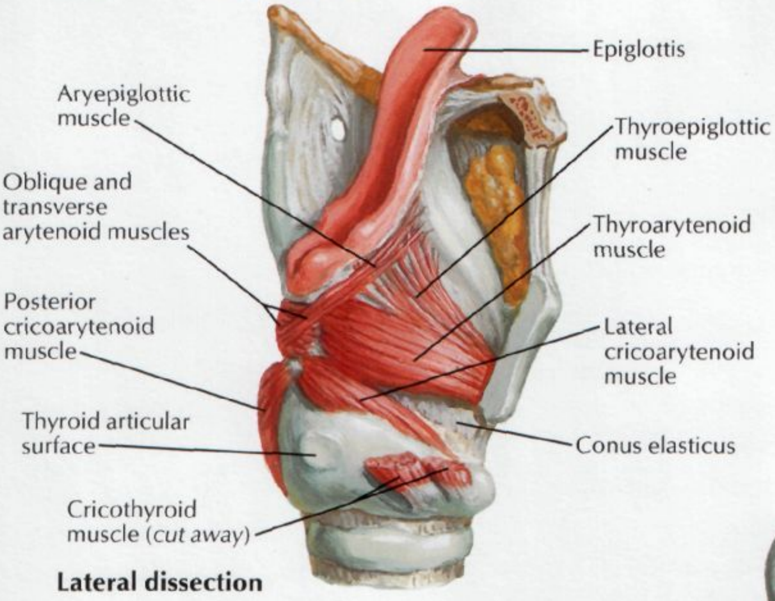
Intrinsic Muscles of Larynx



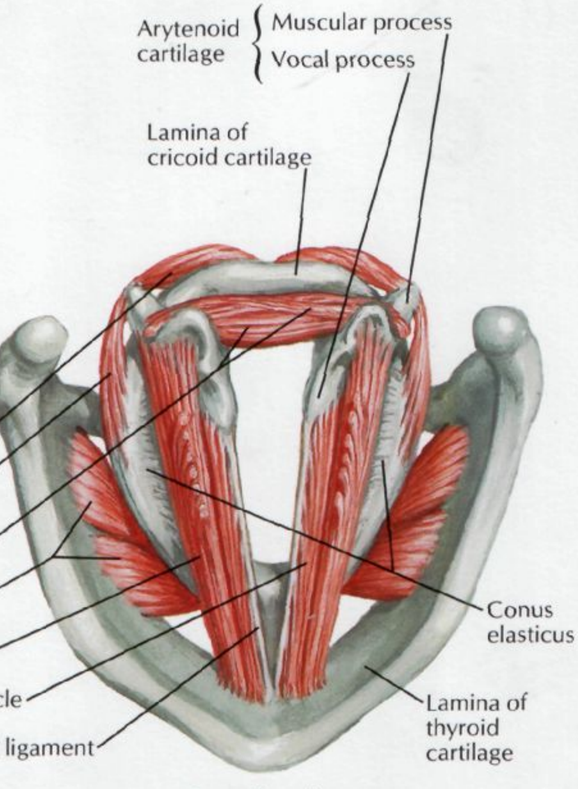
Posterior view


Foramen for superior laryngeal vessels and internal branch of superior laryngeal nerve
Oblique and transverse arytenoid muscles
Posterior cricoarytenoid muscle
Straight part
Oblique part
Cricothyroid muscle

Right lateral view


Epiglottis
Aryepiglottic muscle
Thyroepiglottic muscle
Oblique and transverse arytenoid muscles
Thyroarytenoid muscle
Posterior cricoarytenoid muscle
Lateral cricoarytenoid muscle
Conus elasticus
Thyroid articular surface
Cricothyroid muscle (*cut away*)

Lateral dissection


Arytenoid cartilage
Muscular process
Vocal process
Lamina of cricoid cartilage
Posterior cricoarytenoid muscle
Lateral cricoarytenoid muscle
Transverse and oblique arytenoid muscles
Cricothyroid muscle
Thyroarytenoid muscle
Vocalis muscle
Vocal ligament
Conus elasticus
Lamina of thyroid cartilage

Superior view

Action of Intrinsic Muscles of Larynx

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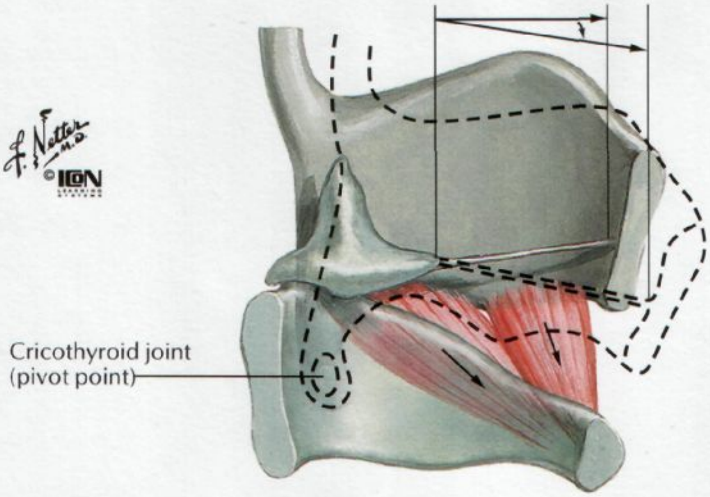
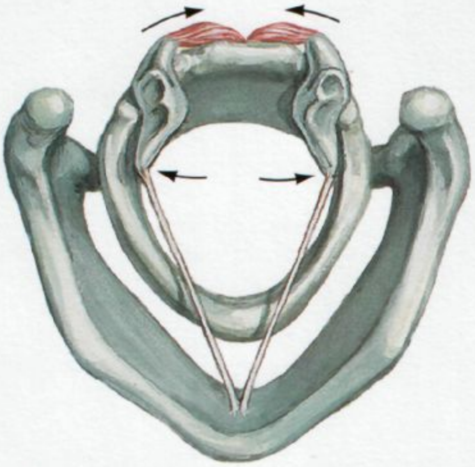
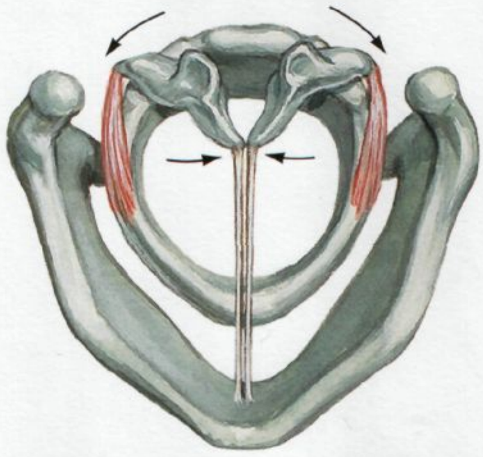


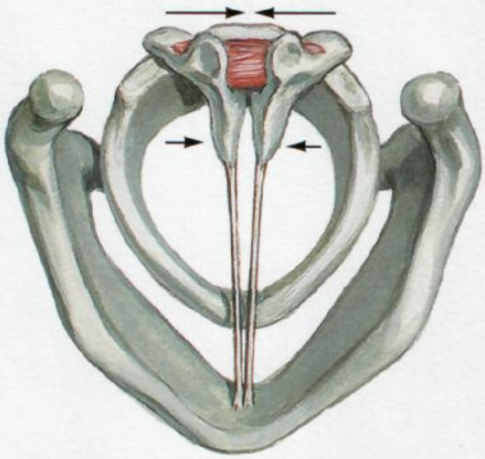
Action of cricothyroid muscles
Lengthening (increasing tension) of vocal ligaments



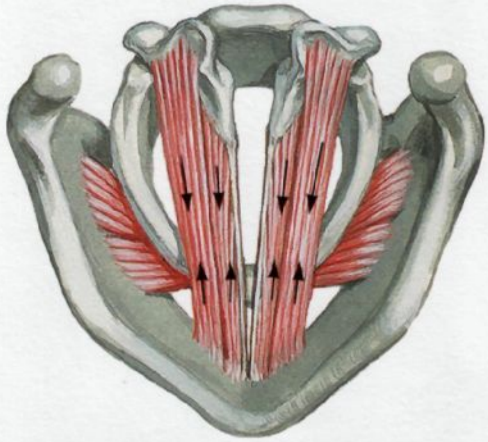
Action of posterior cricoarytenoid muscles
Abduction of vocal ligaments



Action of lateral cricoarytenoid muscles
Adduction of vocal ligaments



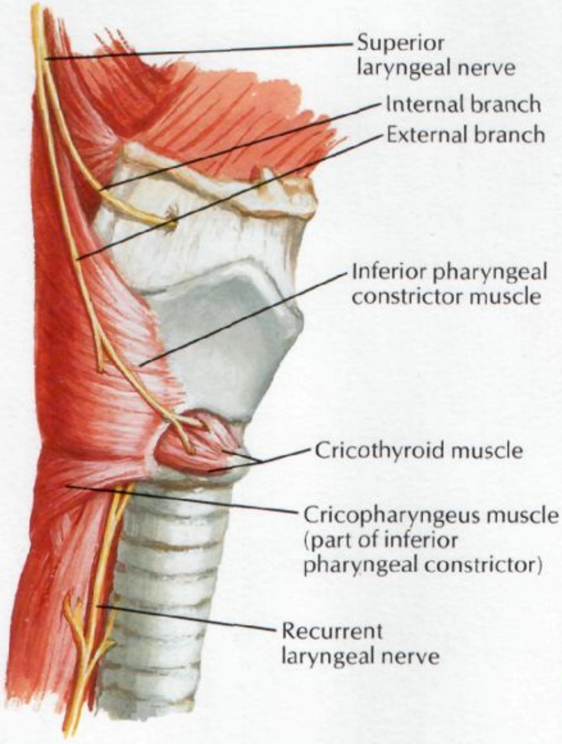
Action of transverse arytenoid muscle
Adduction of vocal ligaments



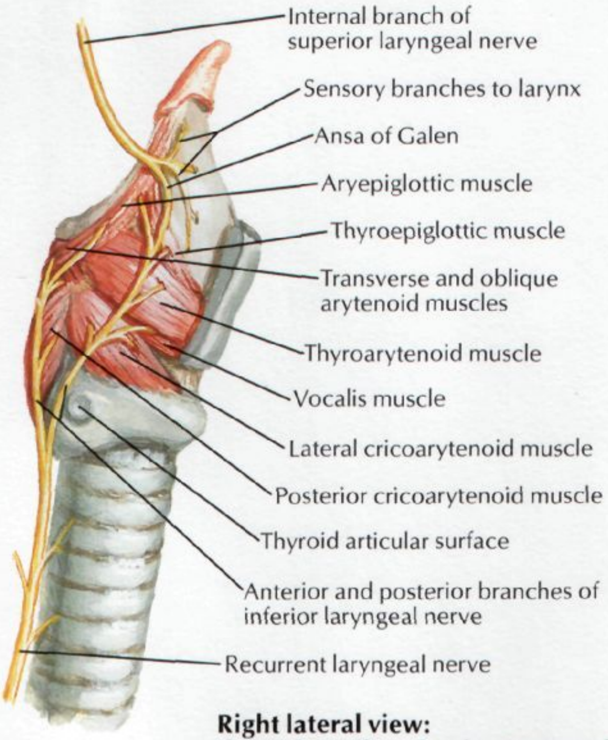
Action of vocalis and thyroarytenoid muscles
Shortening (relaxation) of vocal ligaments

Nerves of Larynx

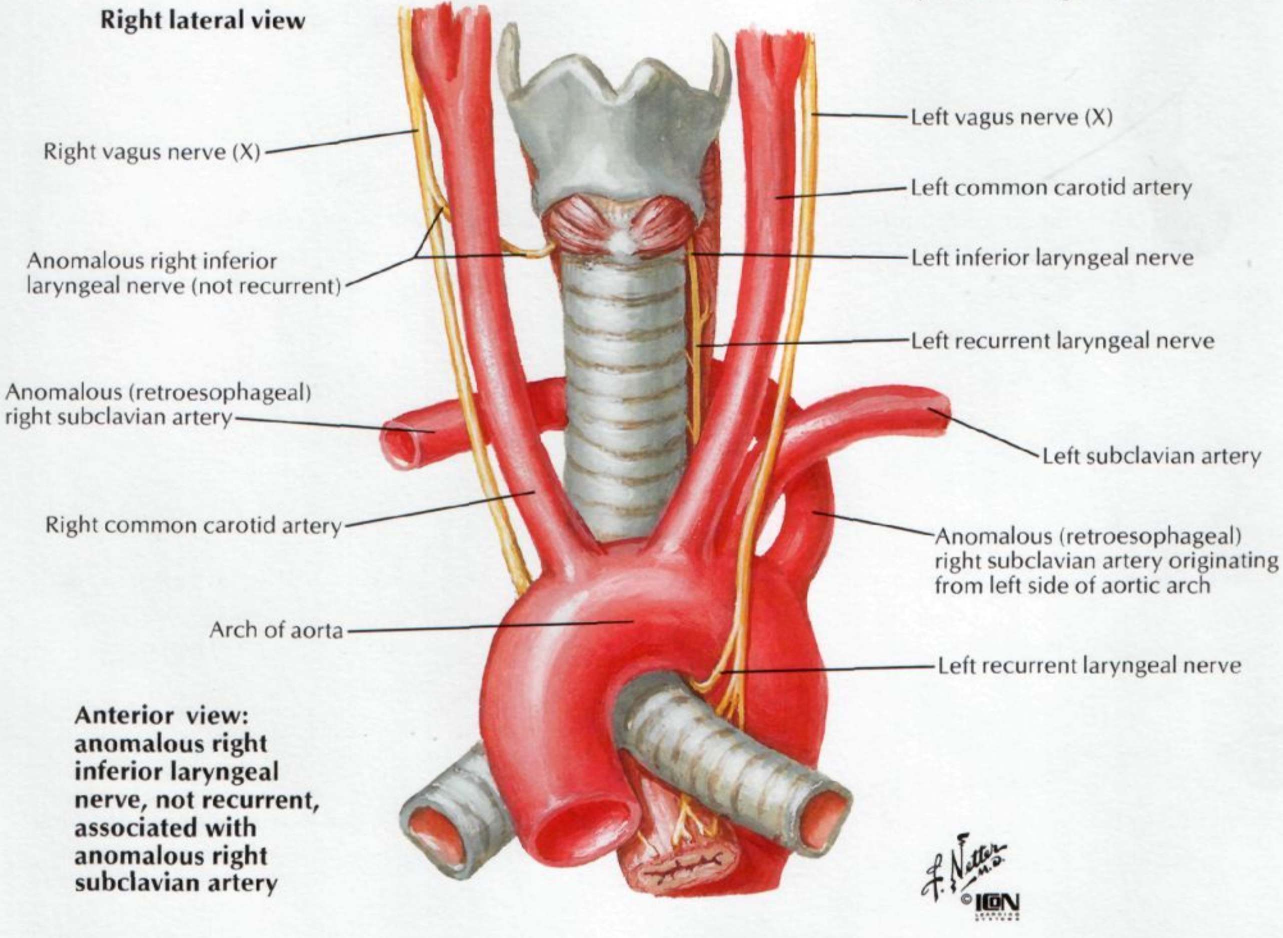
SEE ALSO PLATES 70–72, 231


Superior laryngeal nerve
Internal branch
External branch
Inferior pharyngeal constrictor muscle
Cricothyroid muscle
Cricopharyngeus muscle (part of inferior pharyngeal constrictor)
Recurrent laryngeal nerve

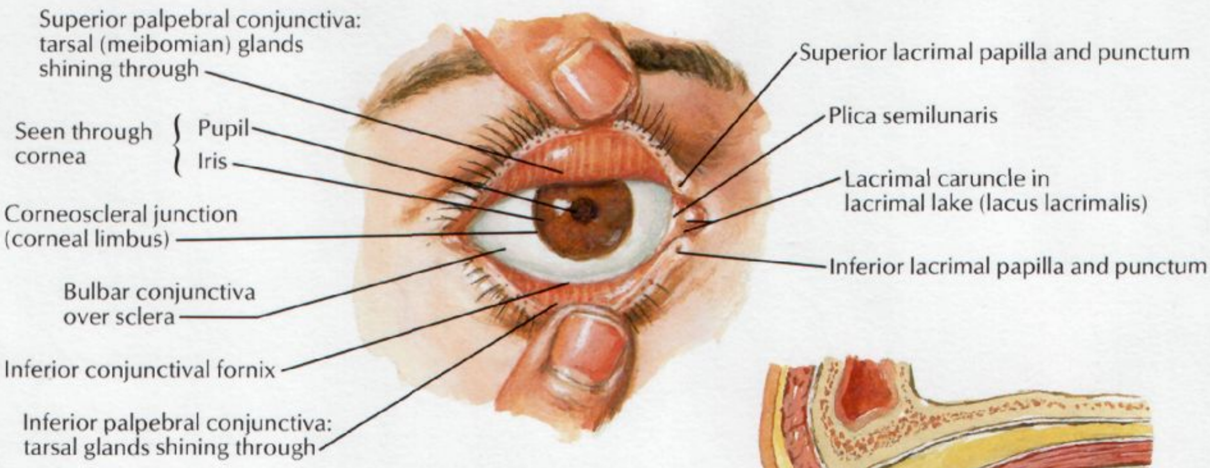
Right lateral view

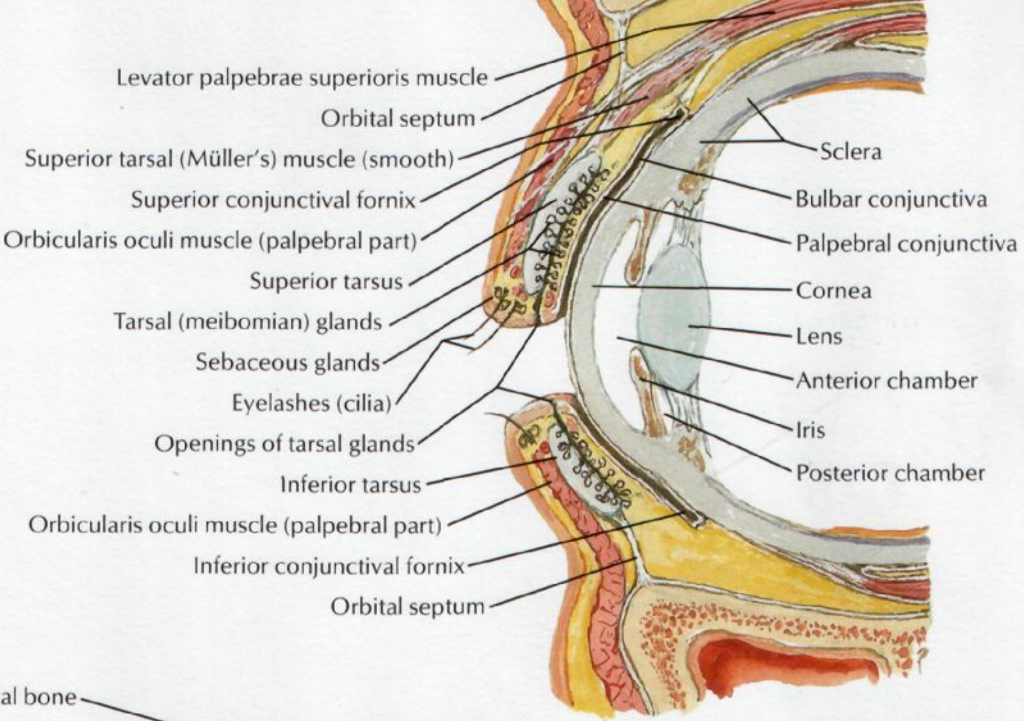

Internal branch of superior laryngeal nerve
Sensory branches to larynx
Ansa of Galen
Aryepiglottic muscle
Thyroepiglottic muscle
Transverse and oblique arytenoid muscles
Thyroarytenoid muscle
Vocalis muscle
Lateral cricoarytenoid muscle
Posterior cricoarytenoid muscle
Thyroid articular surface
Anterior and posterior branches of inferior laryngeal nerve
Recurrent laryngeal nerve

Right lateral view: thyroid cartilage lamina removed


Right vagus nerve (X)
Anomalous right inferior laryngeal nerve (not recurrent)
Anomalous (retroesophageal) right subclavian artery
Right common carotid artery
Arch of aorta
Left vagus nerve (X)
Left common carotid artery
Left inferior laryngeal nerve
Left recurrent laryngeal nerve
Left subclavian artery
Anomalous (retroesophageal) right subclavian artery originating from left side of aortic arch
Left recurrent laryngeal nerve

Anterior view: anomalous right inferior laryngeal nerve, not recurrent, associated with anomalous right subclavian artery


Superior palpebral conjunctiva: tarsal (meibomian) glands shining through
Seen through cornea
Pupil
Iris
Corneoscleral junction (corneal limbus)
Bulbar conjunctiva over sclera
Inferior conjunctival fornix
Inferior palpebral conjunctiva: tarsal glands shining through
Superior lacrimal papilla and punctum
Plica semilunaris
Lacrimal caruncle in lacrimal lake (lacus lacrimalis)
Inferior lacrimal papilla and punctum


Levator palpebrae superioris muscle
Orbital septum
Superior tarsal (Müller's) muscle (smooth)
Superior conjunctival fornix
Orbicularis oculi muscle (palpebral part)
Superior tarsus
Tarsal (meibomian) glands
Sebaceous glands
Eyelashes (cilia)
Openings of tarsal glands
Inferior tarsus
Orbicularis oculi muscle (palpebral part)
Inferior conjunctival fornix
Orbital septum
Sclera
Bulbar conjunctiva
Palpebral conjunctiva
Cornea
Lens
Anterior chamber
Iris
Posterior chamber

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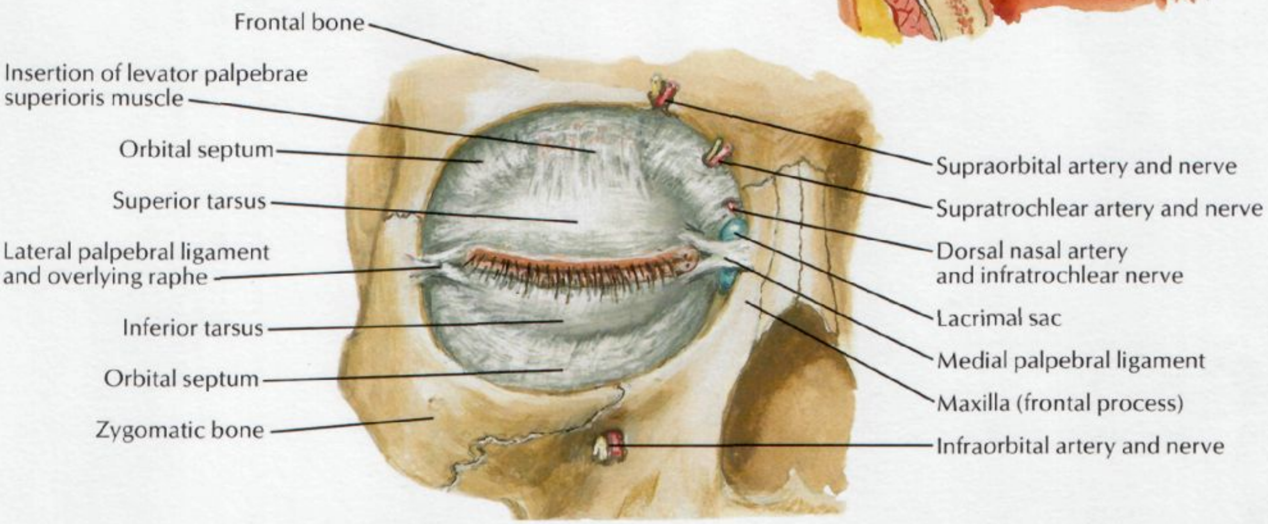
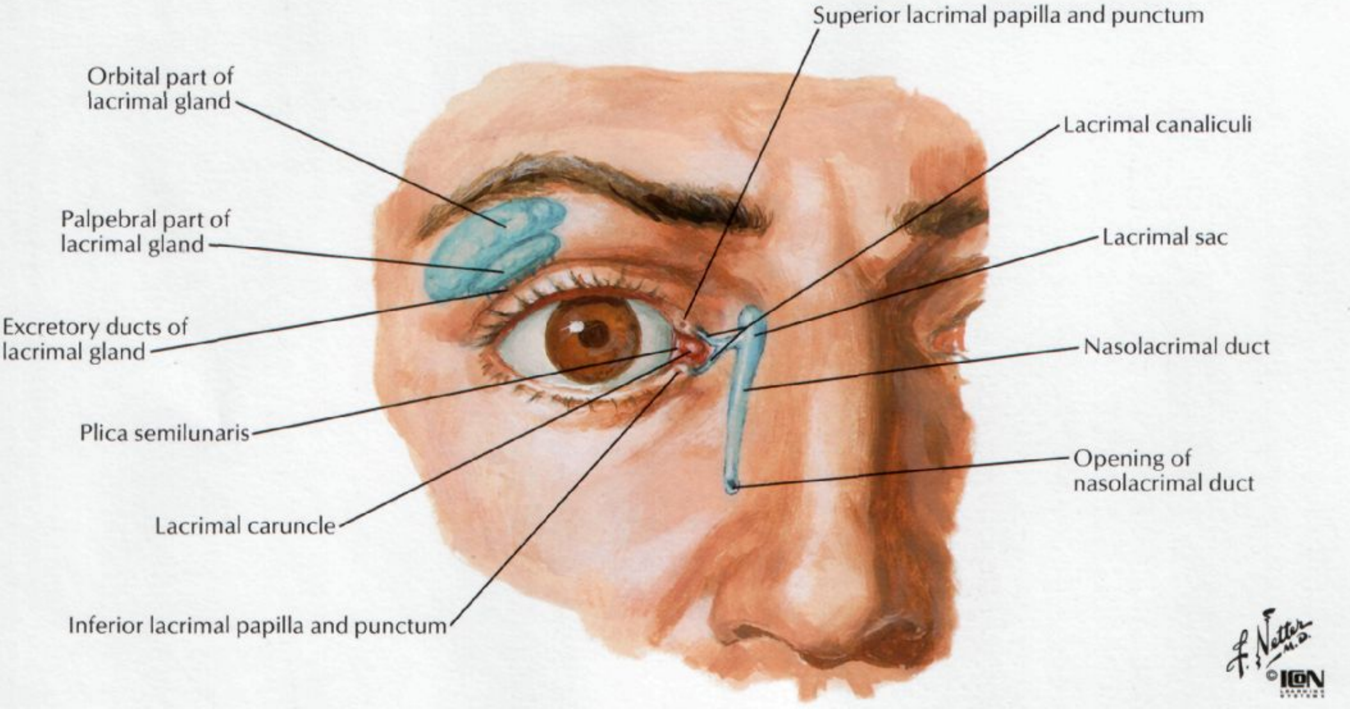

Frontal bone
Insertion of levator palpebrae superioris muscle
Orbital septum
Superior tarsus
Lateral palpebral ligament and overlying raphe
Inferior tarsus
Orbital septum
Zygomatic bone
Supraorbital artery and nerve
Supratrochlear artery and nerve
Dorsal nasal artery and infratrochlear nerve
Lacrimal sac
Medial palpebral ligament
Maxilla (frontal process)
Infraorbital artery and nerve

Lacrimal Apparatus

SEE ALSO PLATES 41, 127


Superior lacrimal papilla and punctum
Orbital part of lacrimal gland
Lacrimal canaliculi
Palpebral part of lacrimal gland
Lacrimal sac
Excretory ducts of lacrimal gland
Nasolacrimal duct
Plica semilunaris
Opening of nasolacrimal duct
Lacrimal caruncle
Inferior lacrimal papilla and punctum
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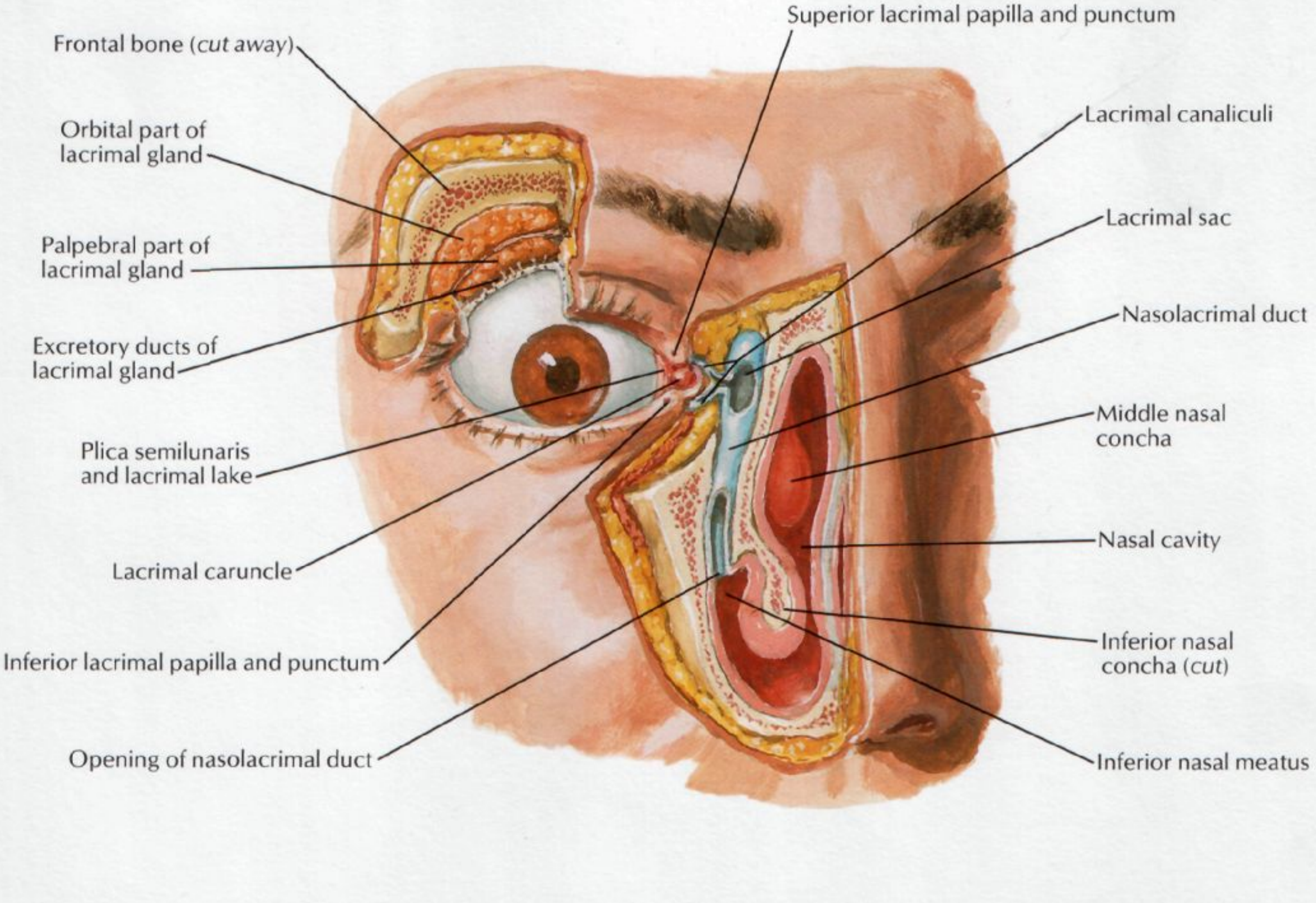
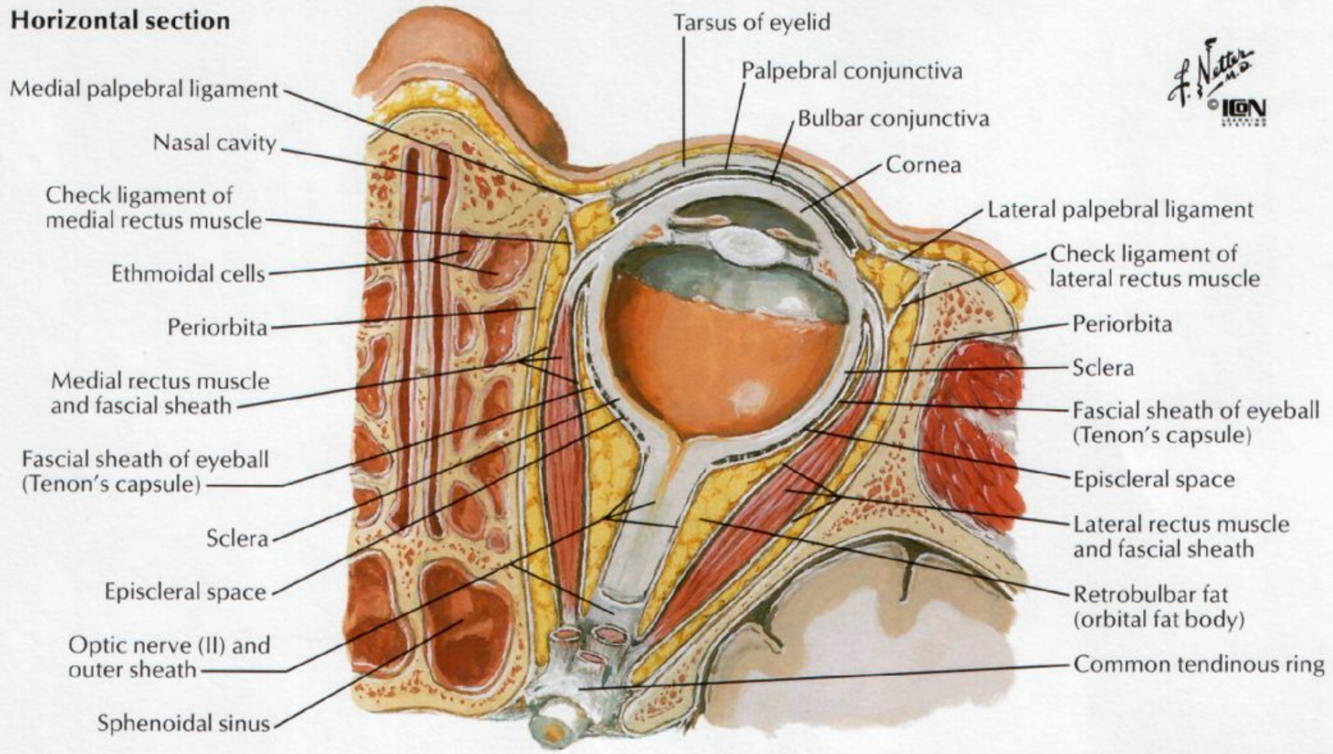
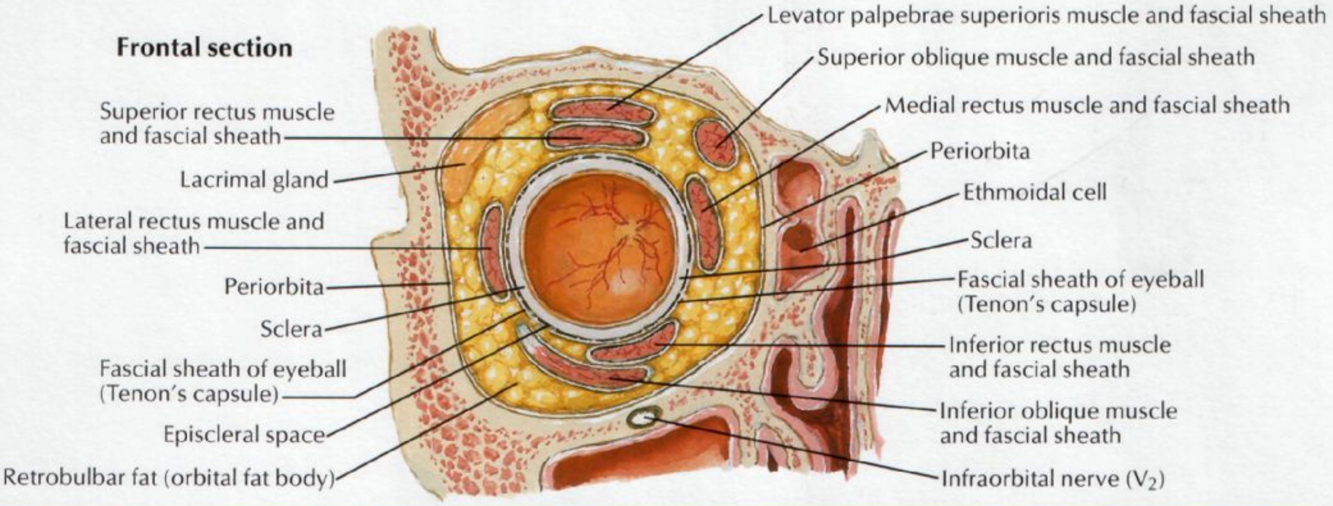

Superior lacrimal papilla and punctum
Frontal bone (*cut away*)
Lacrimal canaliculi
Orbital part of lacrimal gland
Lacrimal sac
Palpebral part of lacrimal gland
Nasolacrimal duct
Excretory ducts of lacrimal gland
Middle nasal concha
Plica semilunaris and lacrimal lake
Nasal cavity
Lacrimal caruncle
Inferior lacrimal papilla and punctum
Inferior nasal concha (*cut*)
Opening of nasolacrimal duct
Inferior nasal meatus

Fascia of Orbit and Eyeball

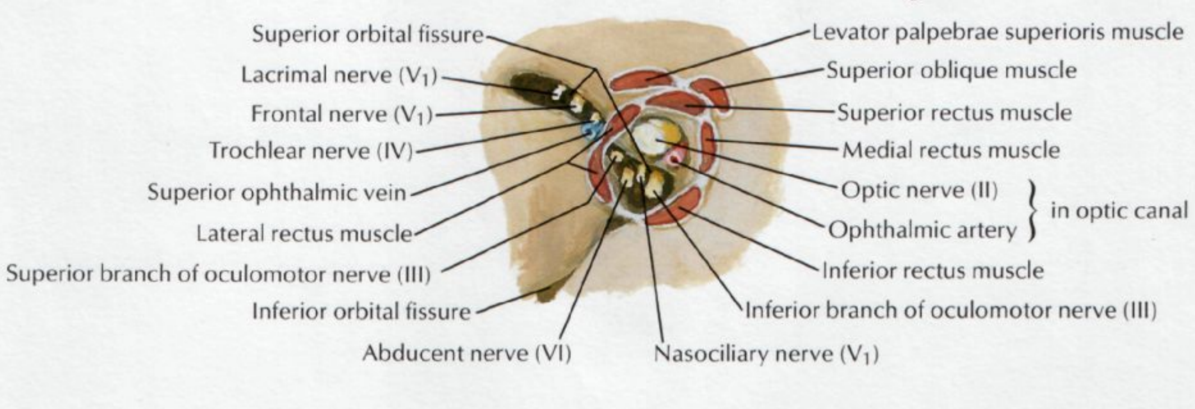
Horizontal section


Tarsus of eyelid
Palpebral conjunctiva
Bulbar conjunctiva
Cornea
Medial palpebral ligament
Nasal cavity
Check ligament of medial rectus muscle
Ethmoidal cells
Periorbita
Medial rectus muscle and fascial sheath
Fascial sheath of eyeball (Tenon's capsule)
Sclera
Episcleral space
Optic nerve (II) and outer sheath
Sphenoidal sinus
Lateral palpebral ligament
Check ligament of lateral rectus muscle
Periorbita
Sclera
Fascial sheath of eyeball (Tenon's capsule)
Episcleral space
Lateral rectus muscle and fascial sheath
Retrobulbar fat (orbital fat body)
Common tendinous ring

Frontal section

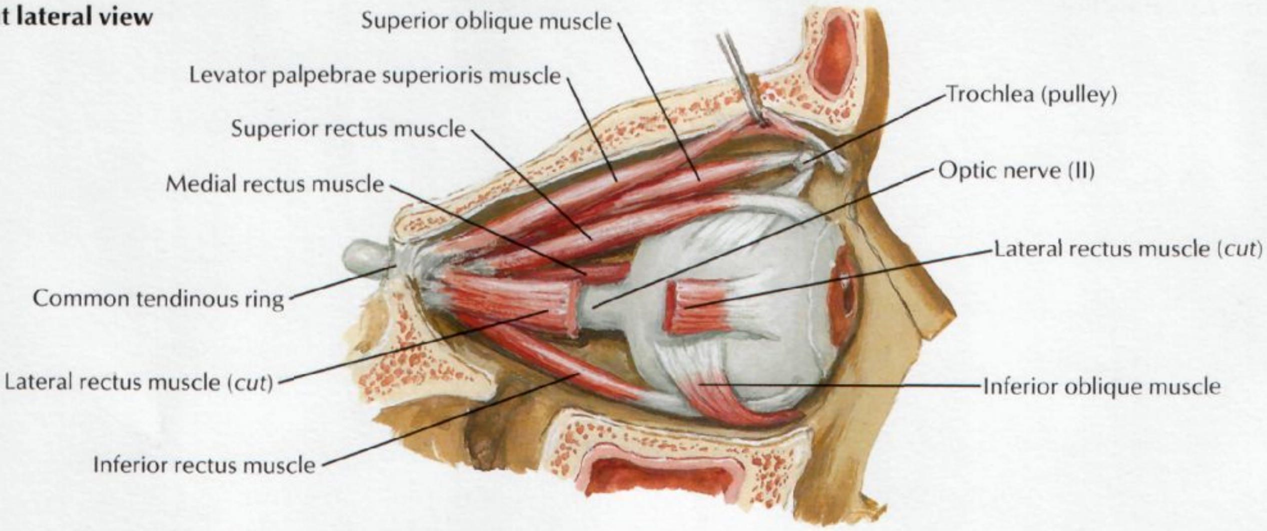

Levator palpebrae superioris muscle and fascial sheath
Superior oblique muscle and fascial sheath
Medial rectus muscle and fascial sheath
Periorbita
Ethmoidal cell
Sclera
Fascial sheath of eyeball (Tenon's capsule)
Inferior rectus muscle and fascial sheath
Inferior oblique muscle and fascial sheath
Infraorbital nerve (V_2)
Superior rectus muscle and fascial sheath
Lacrimal gland
Lateral rectus muscle and fascial sheath
Periorbita
Sclera
Fascial sheath of eyeball (Tenon's capsule)
Episcleral space
Retrobulbar fat (orbital fat body)

Muscle attachments and nerves and vessels entering orbit

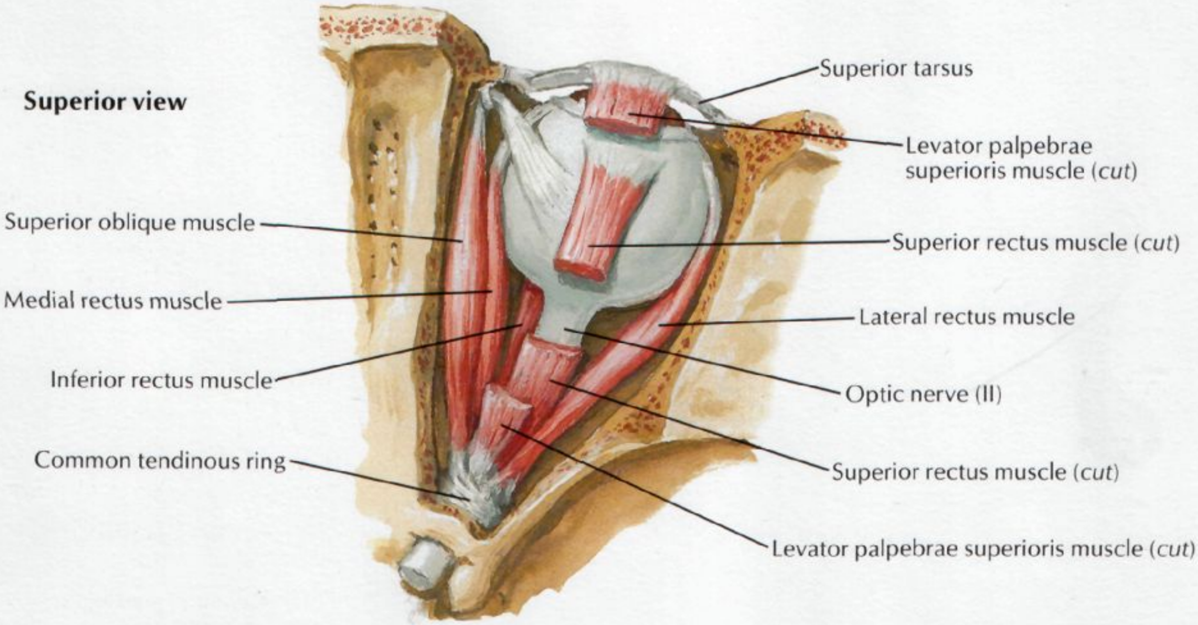


Extrinsic Eye Muscles

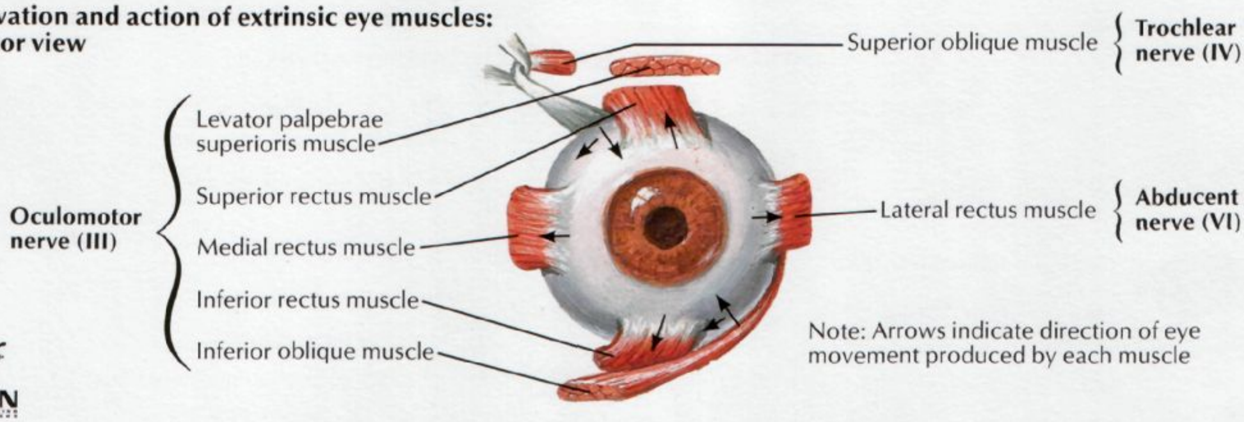
Right lateral view



Superior view


Superior tarsus
Levator palpebrae superioris muscle (*cut*)
Superior oblique muscle
Superior rectus muscle (*cut*)
Medial rectus muscle
Lateral rectus muscle
Inferior rectus muscle
Optic nerve (II)
Common tendinous ring
Superior rectus muscle (*cut*)
Levator palpebrae superioris muscle (*cut*)

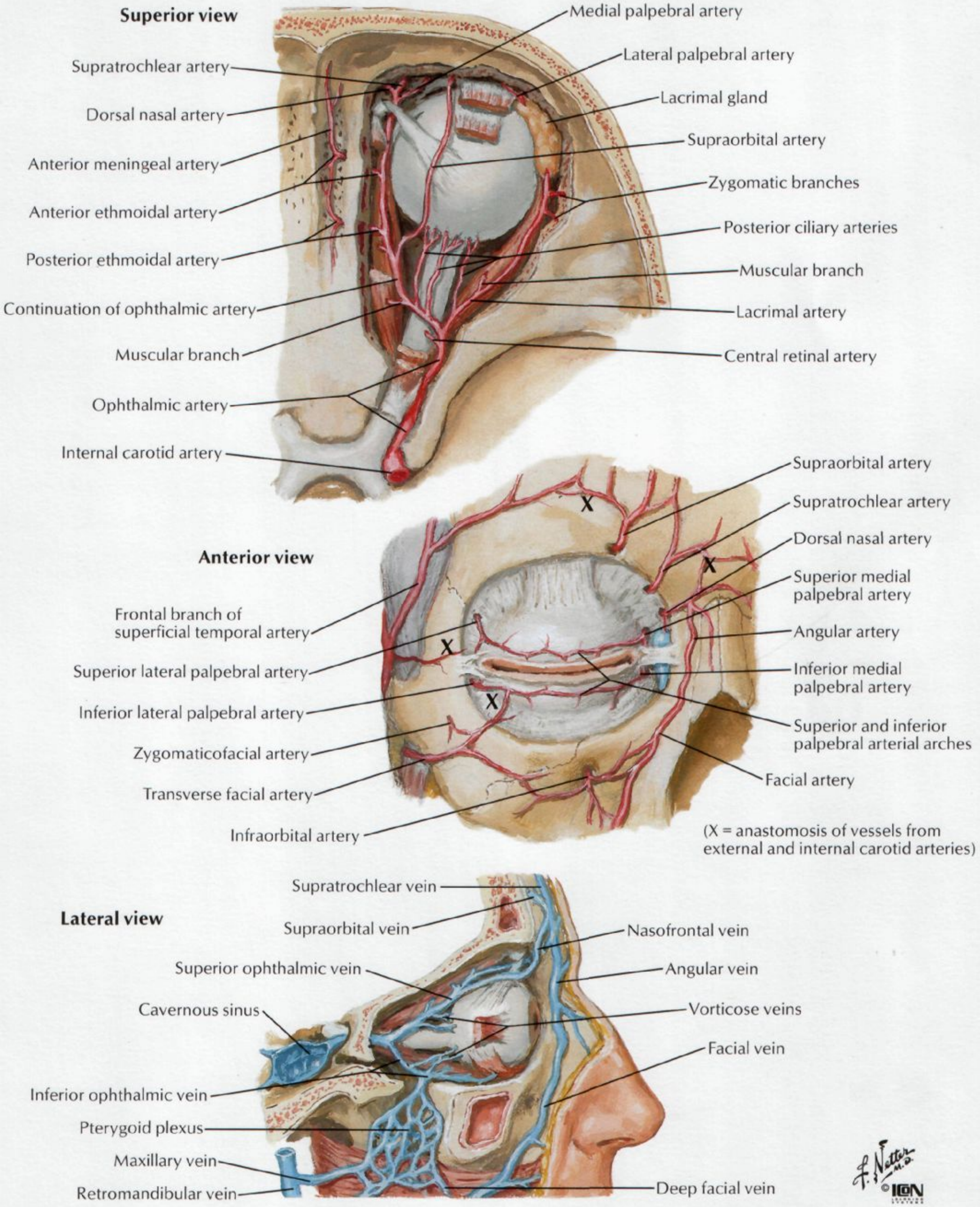
Innervation and action of extrinsic eye muscles: anterior view



Note: Arrows indicate direction of eye movement produced by each muscle

Arteries and Veins of Orbit and Eyelids

SEE ALSO PLATES 19, 98



Superior view

Anterior view

Supraorbital artery
X
Supratrochlear artery
Dorsal nasal artery
X
Superior medial palpebral artery
Frontal branch of superficial temporal artery
Angular artery
Superior lateral palpebral artery
X
Inferior medial palpebral artery
Inferior lateral palpebral artery
X
Superior and inferior palpebral arterial arches
Zygomaticofacial artery
Facial artery
Transverse facial artery
Infraorbital artery

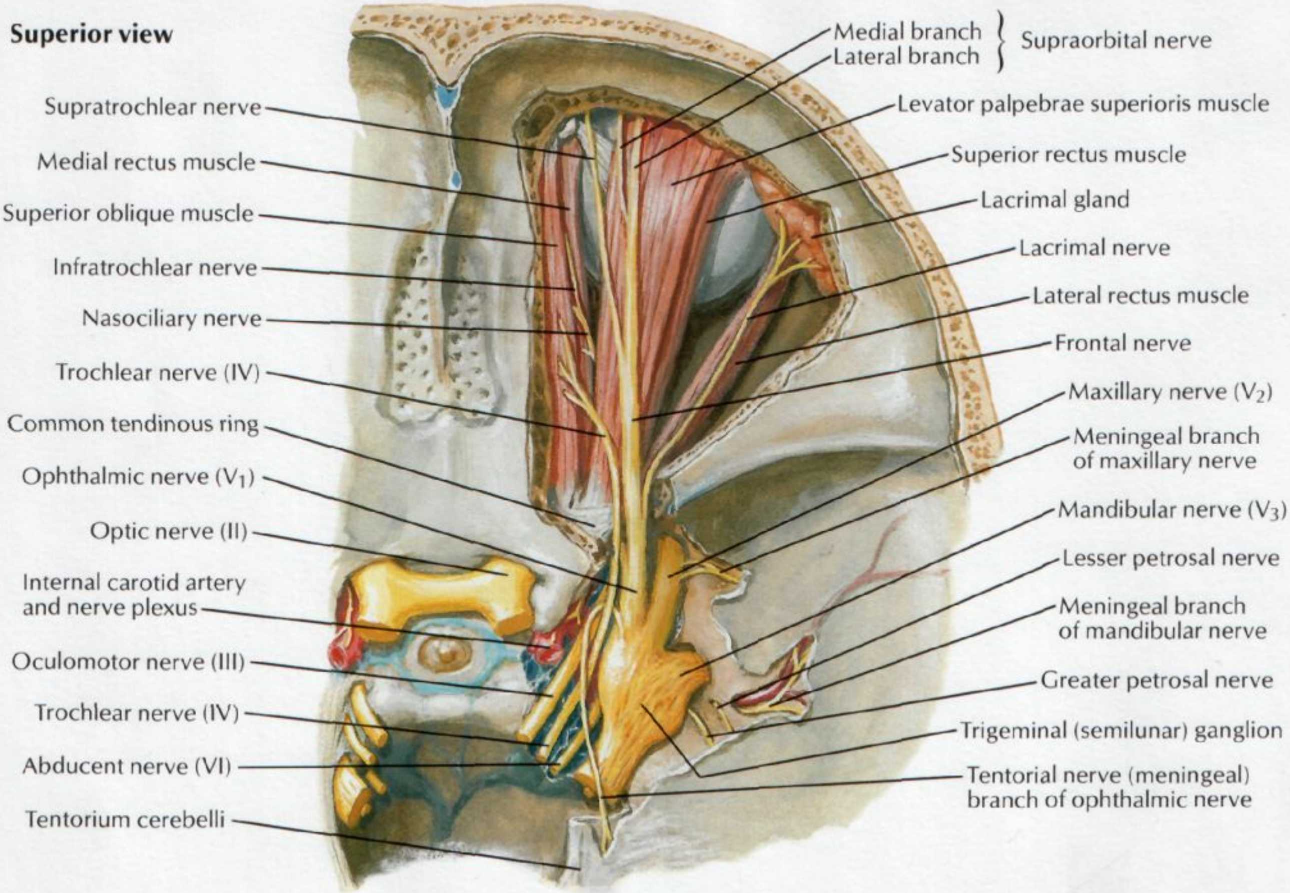
(X = anastomosis of vessels from external and internal carotid arteries)

Lateral view

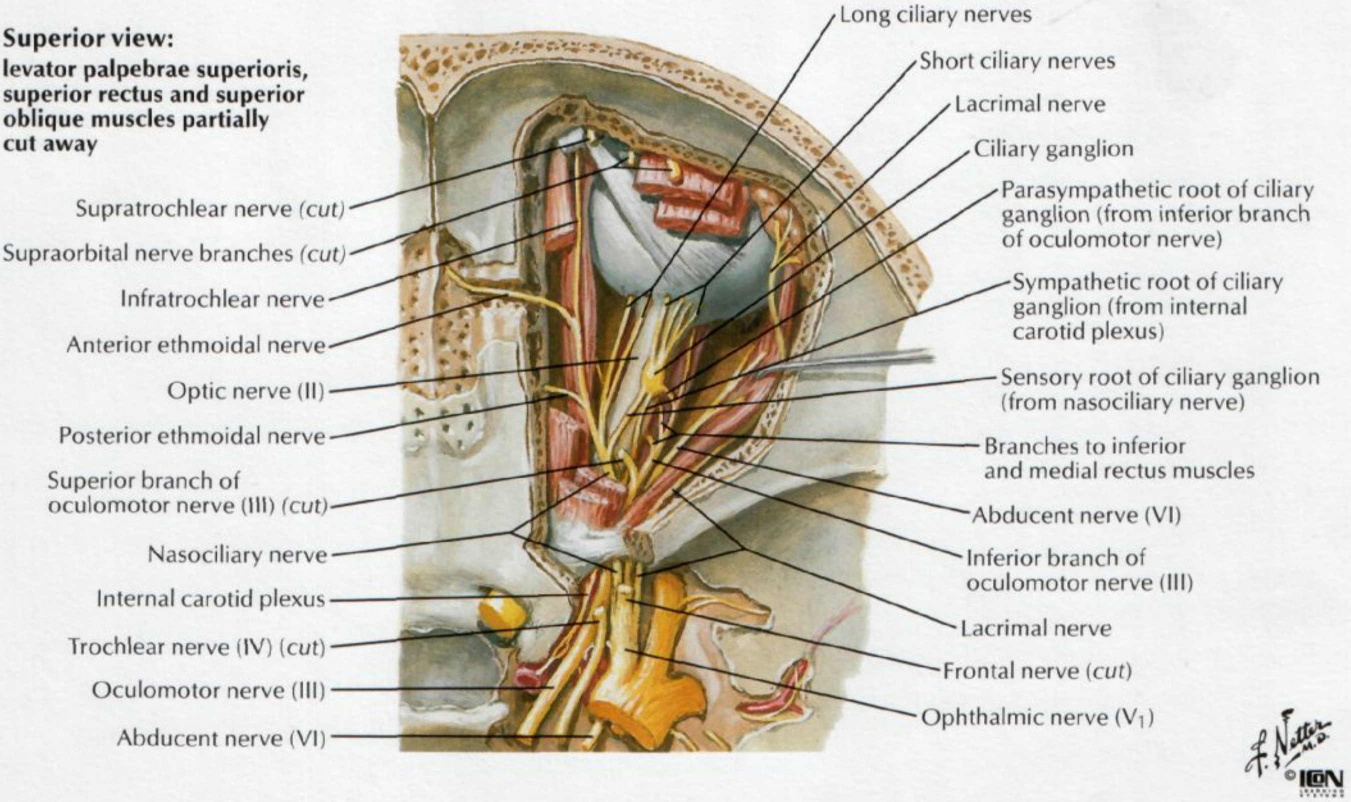
Nerves of Orbit

SEE ALSO PLATES 41, 115, 126

Superior view



Superior view:
levator palpebrae superioris, superior rectus and superior oblique muscles partially cut away


Supratrochlear nerve *(cut)*
Supraorbital nerve branches *(cut)*
Infratrochlear nerve
Anterior ethmoidal nerve
Optic nerve (II)
Posterior ethmoidal nerve
Superior branch of oculomotor nerve (III) *(cut)*
Nasociliary nerve
Internal carotid plexus
Trochlear nerve (IV) (*cut*)
Oculomotor nerve (III)
Abducent nerve (VI)
Long ciliary nerves
Short ciliary nerves
Lacrimal nerve
Ciliary ganglion
Parasympathetic root of ciliary ganglion (from inferior branch of oculomotor nerve)
Sympathetic root of ciliary ganglion (from internal carotid plexus)
Sensory root of ciliary ganglion (from nasociliary nerve)
Branches to inferior and medial rectus muscles
Abducent nerve (VI)
Inferior branch of oculomotor nerve (III)
Lacrimal nerve
Frontal nerve (*cut*)
Ophthalmic nerve (V_1)
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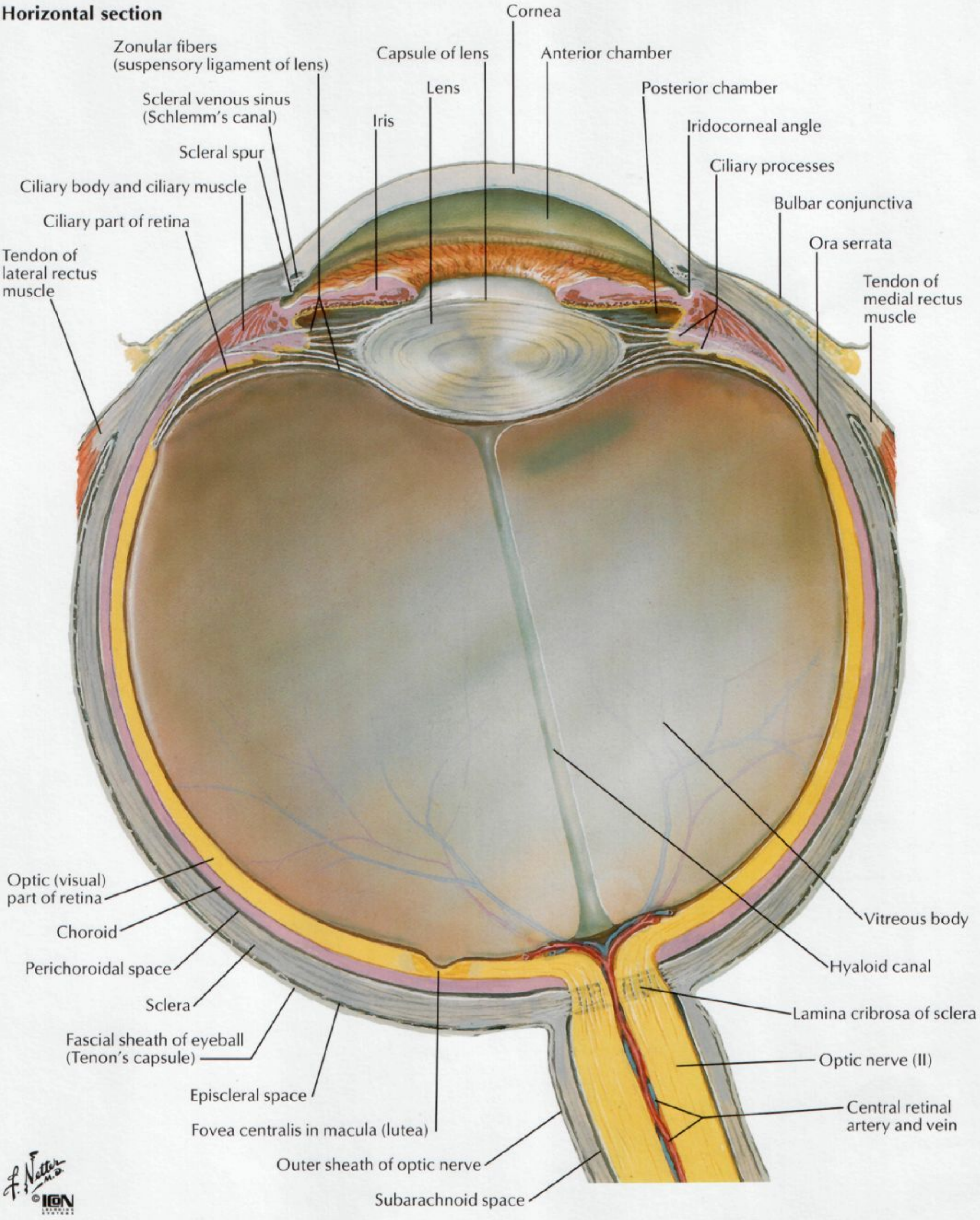
Horizontal section


Cornea
Zonular fibers (suspensory ligament of lens)
Capsule of lens
Anterior chamber
Lens
Posterior chamber
Scleral venous sinus (Schlemm's canal)
Iris
Iridocorneal angle
Scleral spur
Ciliary processes
Ciliary body and ciliary muscle
Bulbar conjunctiva
Ciliary part of retina
Ora serrata
Tendon of lateral rectus muscle
Tendon of medial rectus muscle
Optic (visual) part of retina
Choroid
Vitreous body
Perichoroidal space
Hyaloid canal
Sclera
Lamina cribrosa of sclera
Fascial sheath of eyeball (Tenon's capsule)
Optic nerve (II)
Episcleral space
Central retinal artery and vein
Fovea centralis in macula (lutea)
Outer sheath of optic nerve
Subarachnoid space
F. Netter M.D.
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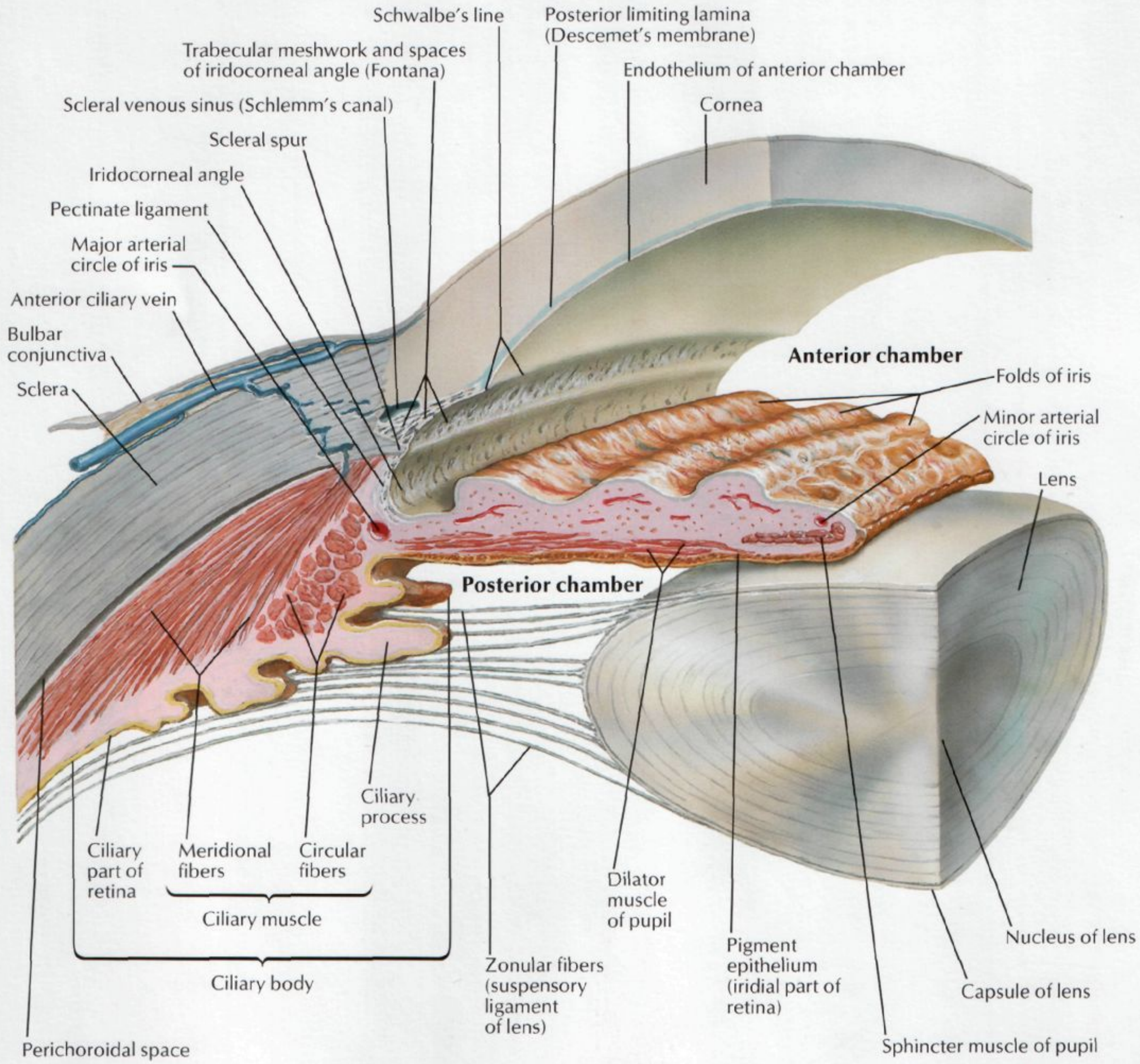
Anterior and Posterior Chambers of Eye


Schwalbe's line
Posterior limiting lamina (Descemet's membrane)
Trabecular meshwork and spaces of iridocorneal angle (Fontana)
Endothelium of anterior chamber
Scleral venous sinus (Schlemm's canal)
Cornea
Scleral spur
Iridocorneal angle
Pectinate ligament
Major arterial circle of iris
Anterior ciliary vein
Bulbar conjunctiva
Sclera
Anterior chamber
Folds of iris
Minor arterial circle of iris
Lens
Posterior chamber
Ciliary process
Ciliary part of retina
Meridional fibers
Circular fibers
Ciliary muscle
Ciliary body
Dilator muscle of pupil
Pigment epithelium (iridial part of retina)
Nucleus of lens
Zonular fibers (suspensory ligament of lens)
Capsule of lens
Sphincter muscle of pupil
Perichoroidal space

Note: For clarity, only single plane of zonular fibers shown; actually, fibers surround entire circumference of lens

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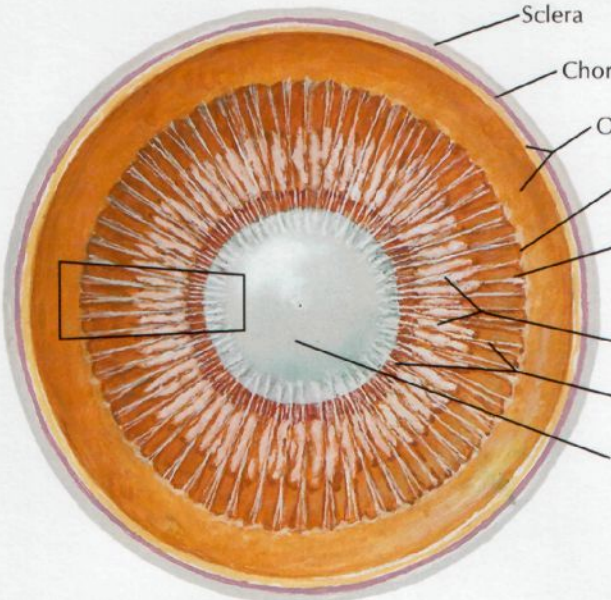
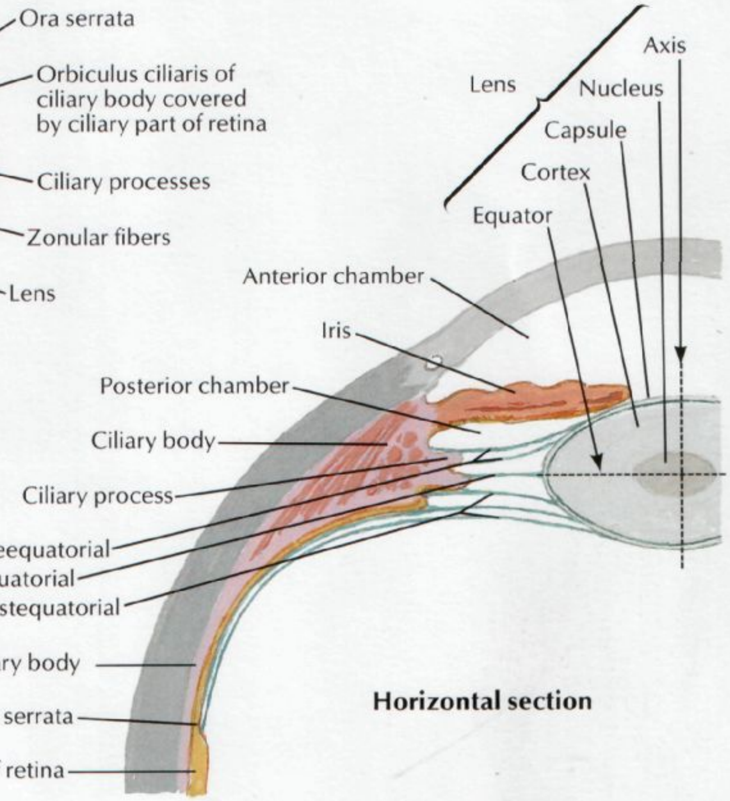
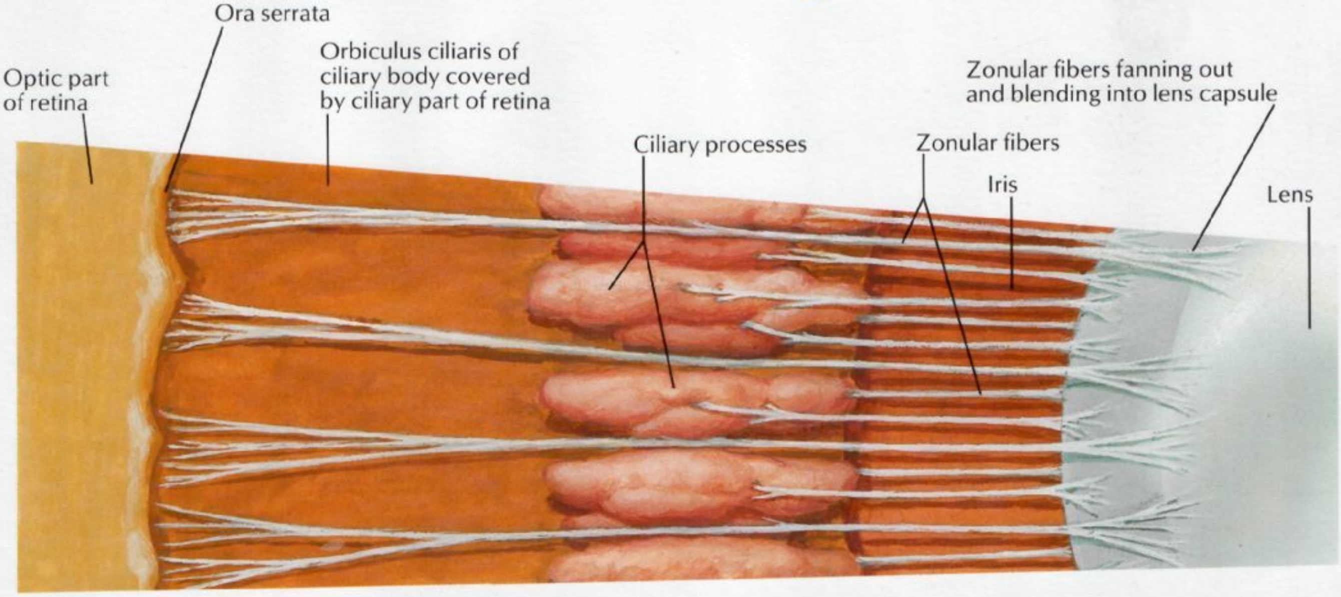
Lens and Supporting Structures



Eyeball sectioned in frontal plane: anterior segment viewed from behind



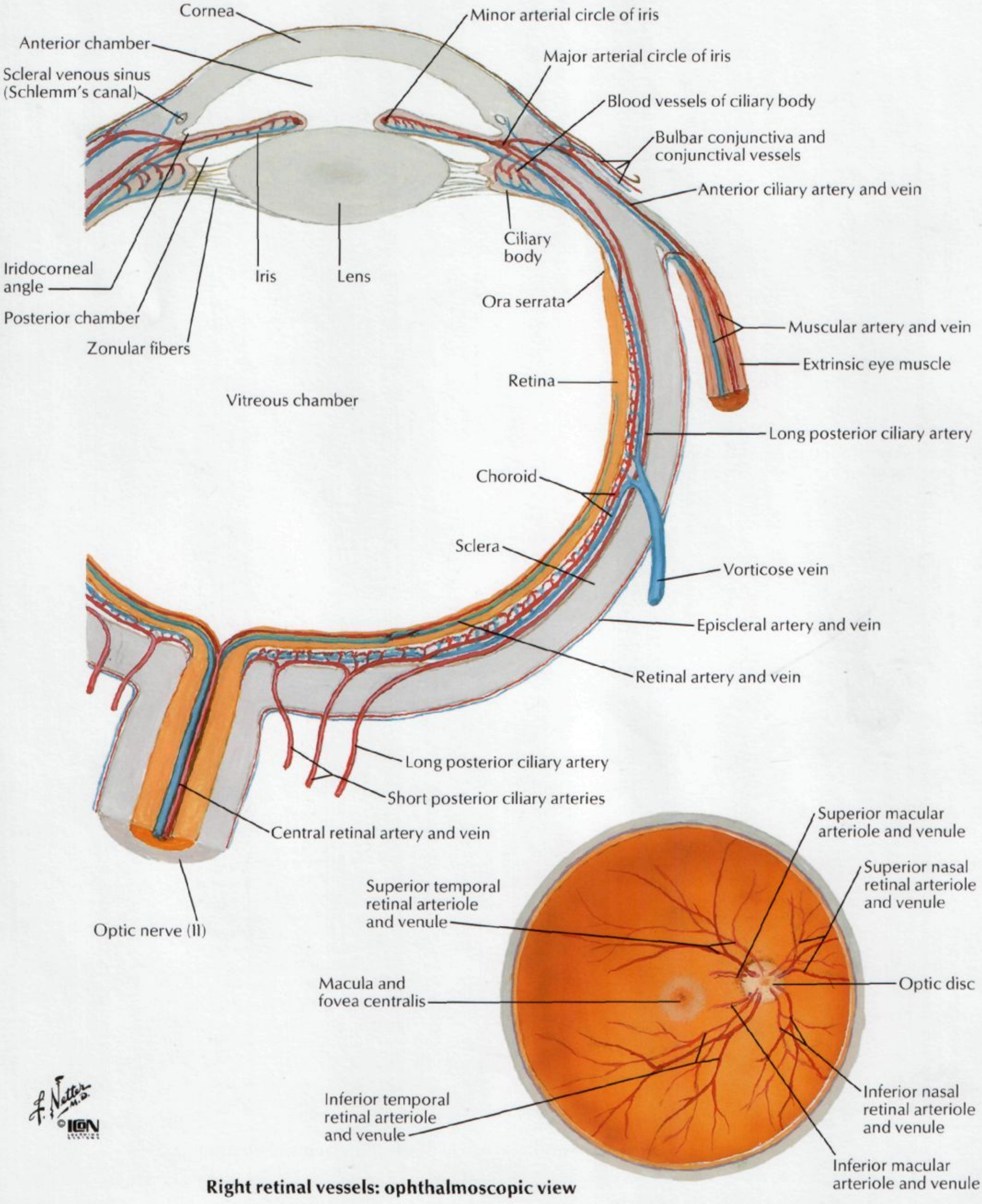
Horizontal section


Ora serrata
Optic part of retina
Orbiculus ciliaris of ciliary body covered by ciliary part of retina
Ciliary processes
Zonular fibers
Iris
Zonular fibers fanning out and blending into lens capsule
Lens

Enlargement of segment outlined in top illustration (semischematic)

Intrinsic Arteries and Veins of Eye

SEE ALSO PLATE 81


Cornea
Minor arterial circle of iris
Anterior chamber
Major arterial circle of iris
Scleral venous sinus (Schlemm's canal)
Blood vessels of ciliary body
Bulbar conjunctiva and conjunctival vessels
Anterior ciliary artery and vein
Ciliary body
Iridocorneal angle
Iris
Lens
Ora serrata
Posterior chamber
Muscular artery and vein
Zonular fibers
Extrinsic eye muscle
Retina
Vitreous chamber
Long posterior ciliary artery
Choroid
Sclera
Vorticose vein
Episcleral artery and vein
Retinal artery and vein
Long posterior ciliary artery
Short posterior ciliary arteries
Central retinal artery and vein
Superior macular arteriole and venule
Superior nasal retinal arteriole and venule
Superior temporal retinal arteriole and venule
Optic nerve (II)
Macula and fovea centralis
Optic disc
Inferior temporal retinal arteriole and venule
Inferior nasal retinal arteriole and venule
Inferior macular arteriole and venule
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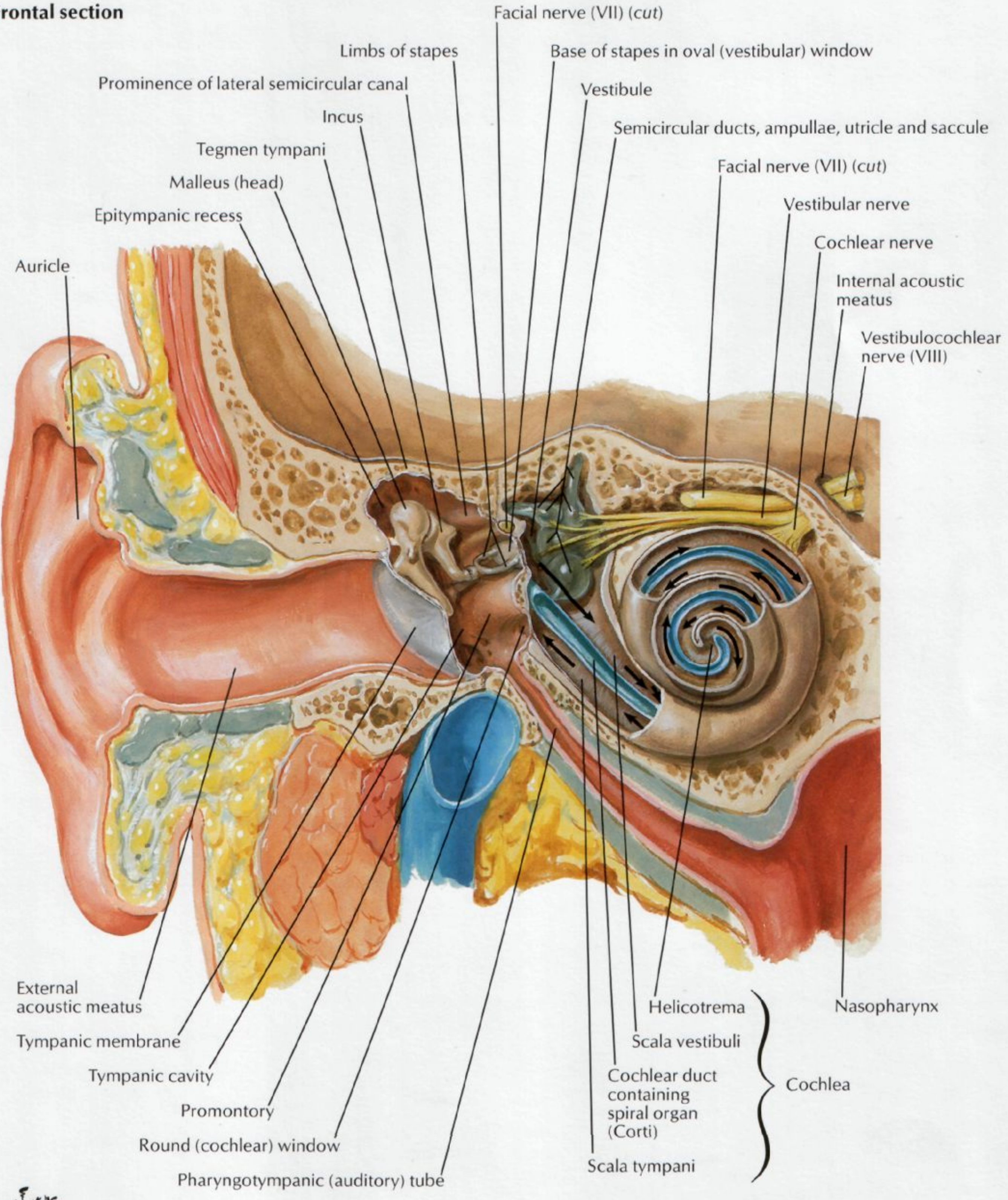
Right retinal vessels: ophthalmoscopic view

Pathway of Sound Reception

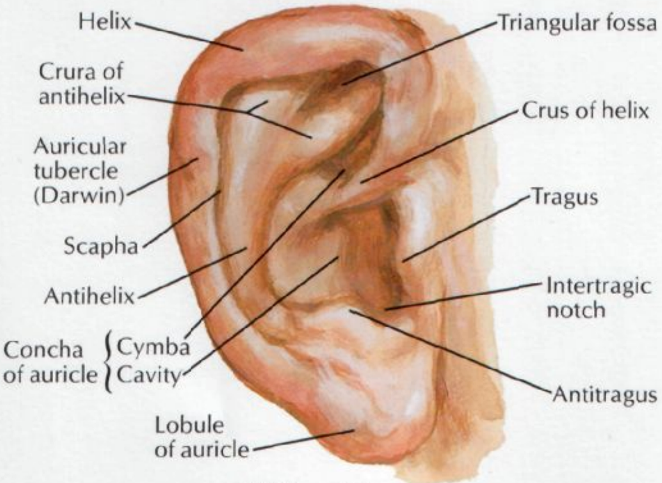
Frontal section



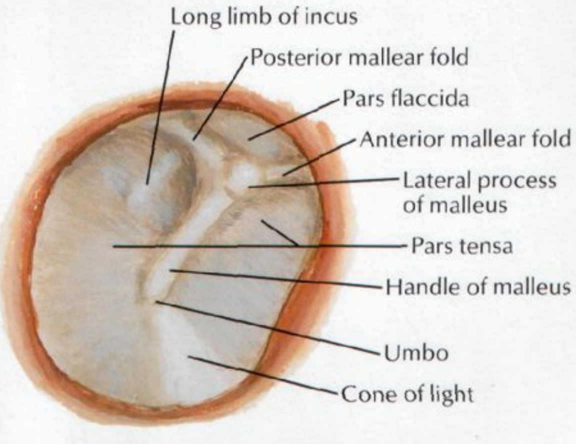
Facial nerve (VII) (*cut*)
Limbs of stapes
Base of stapes in oval (vestibular) window
Prominence of lateral semicircular canal
Vestibule
Incus
Semicircular ducts, ampullae, utricle and saccule
Tegmen tympani
Facial nerve (VII) (*cut*)
Malleus (head)
Vestibular nerve
Epitympanic recess
Cochlear nerve
Auricle
Internal acoustic meatus
Vestibulocochlear nerve (VIII)
External acoustic meatus
Tympanic membrane
Tympanic cavity
Promontory
Round (cochlear) window
Pharyngotympanic (auditory) tube
Helicotrema
Scala vestibuli
Cochlear duct containing spiral organ (Corti)
Scala tympani
Cochlea
Nasopharynx

Note: Arrows indicate course of sound waves

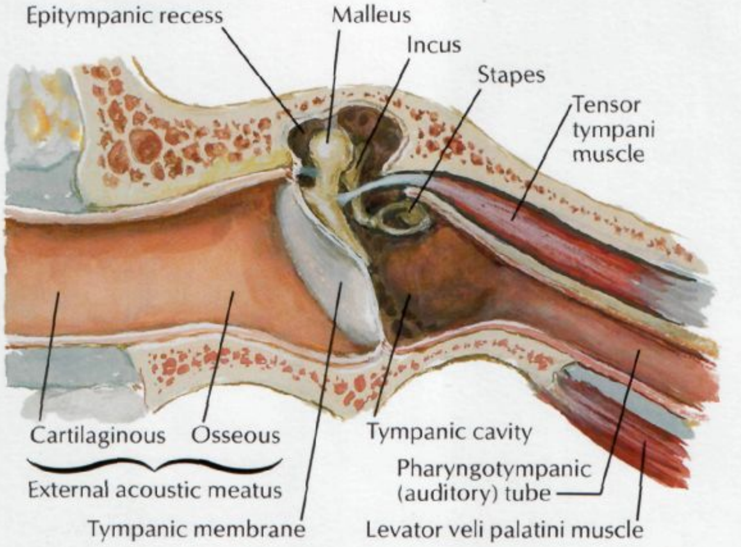
External Ear and Tympanic Cavity



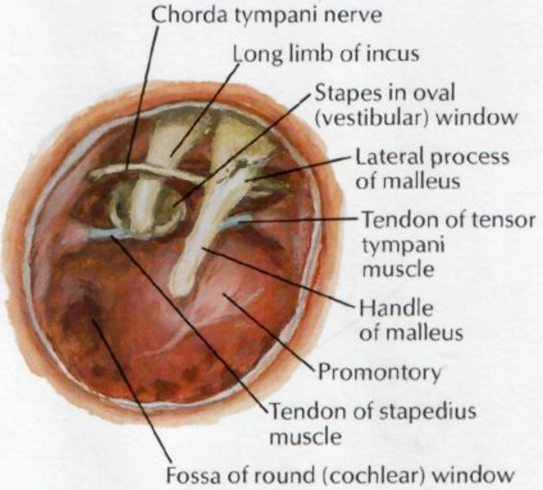
Right auricle



Right tympanic membrane (eardrum) viewed through speculum

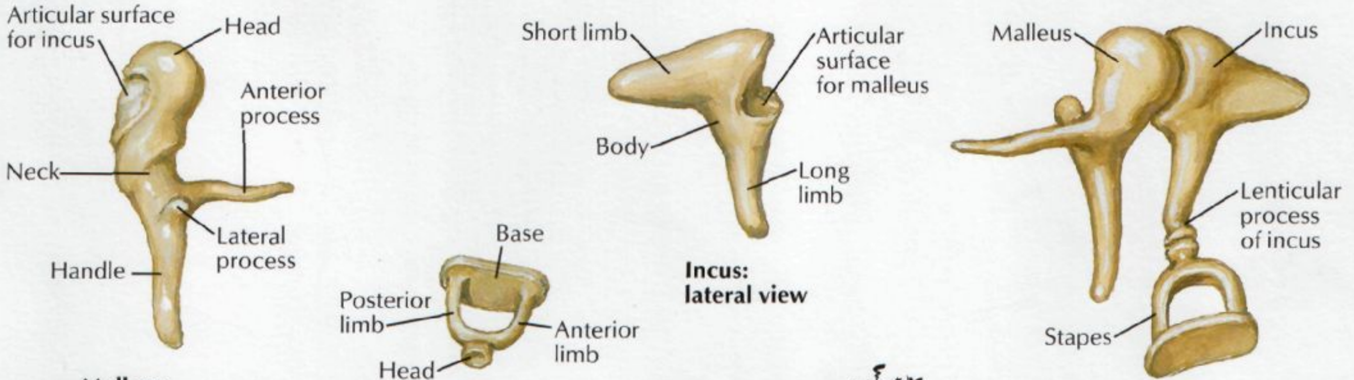


Coronal oblique section of external acoustic meatus and middle ear


Chorda tympani nerve
Long limb of incus
Stapes in oval (vestibular) window
Lateral process of malleus
Tendon of tensor tympani muscle
Handle of malleus
Promontory
Tendon of stapedius muscle
Fossa of round (cochlear) window

View into tympanic cavity after removal of tympanic membrane

Auditory ossicles



Malleus: lateral view

Stapes: superolateral view

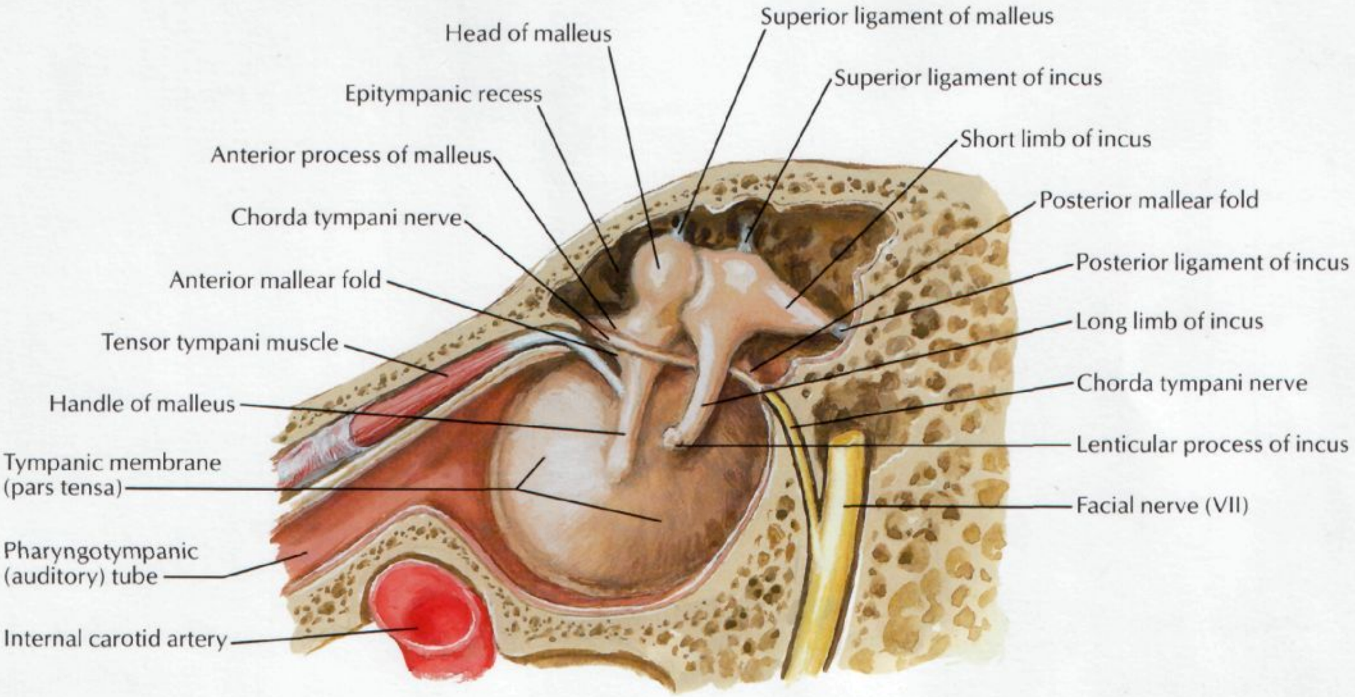
Incus: lateral view

Ossicles articulated: medial view

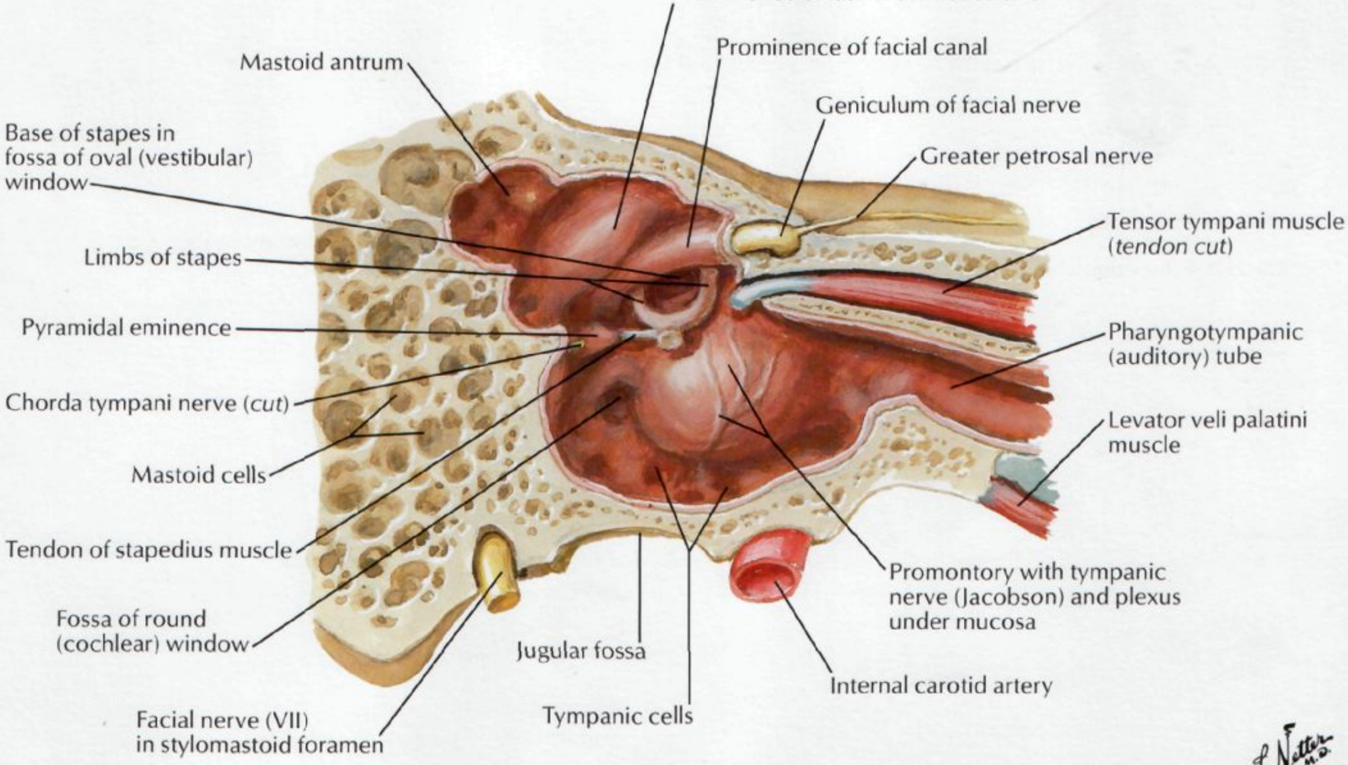
Tympanic Cavity

SEE ALSO PLATES 42, 117, 118, 129

Lateral wall of tympanic cavity: medial (internal) view



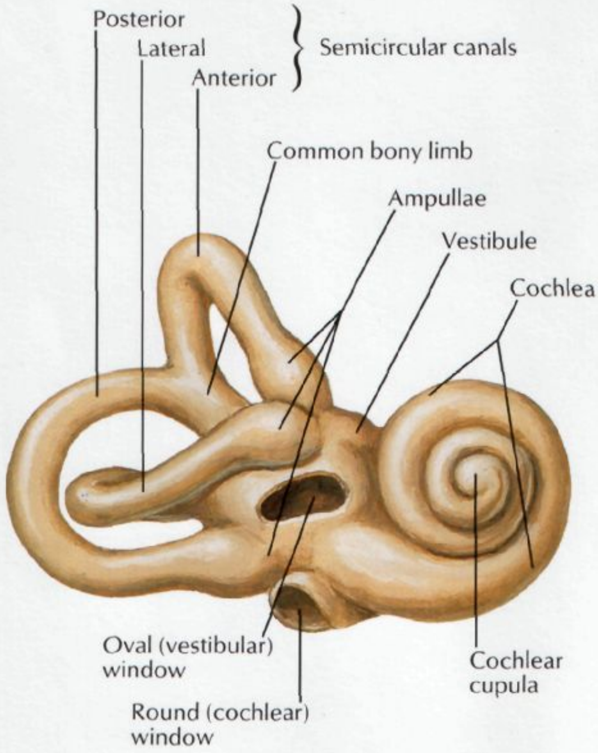
Medial wall of tympanic cavity: lateral view


Prominence of lateral semicircular canal
Prominence of facial canal
Mastoid antrum
Geniculum of facial nerve
Base of stapes in fossa of oval (vestibular) window
Greater petrosal nerve
Tensor tympani muscle (*tendon cut*)
Limbs of stapes
Pyramidal eminence
Pharyngotympanic (auditory) tube
Chorda tympani nerve (*cut*)
Levator veli palatini muscle
Mastoid cells
Tendon of stapedius muscle
Promontory with tympanic nerve (Jacobson) and plexus under mucosa
Fossa of round (cochlear) window
Jugular fossa
Internal carotid artery
Facial nerve (VII) in stylomastoid foramen
Tympanic cells

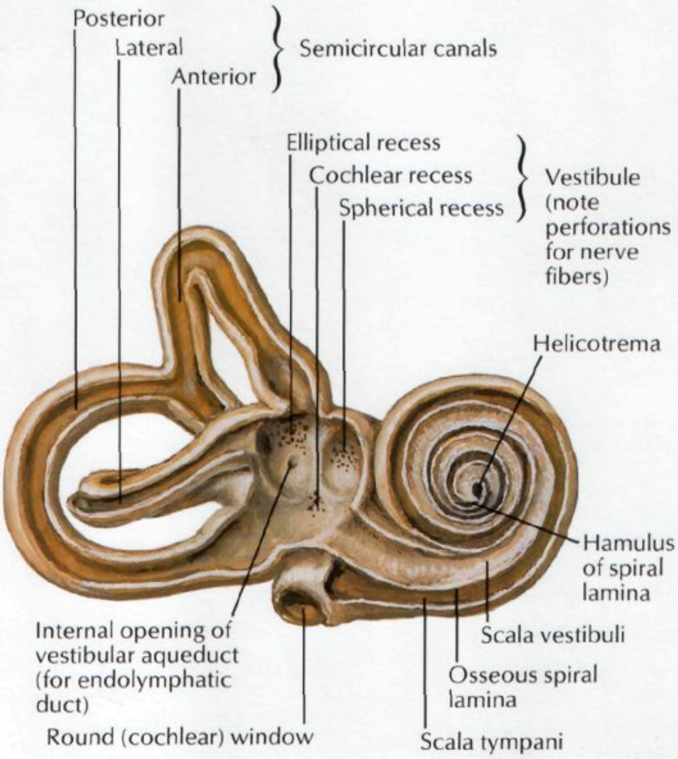
Bony and Membranous Labyrinths

SEE ALSO PLATE 118

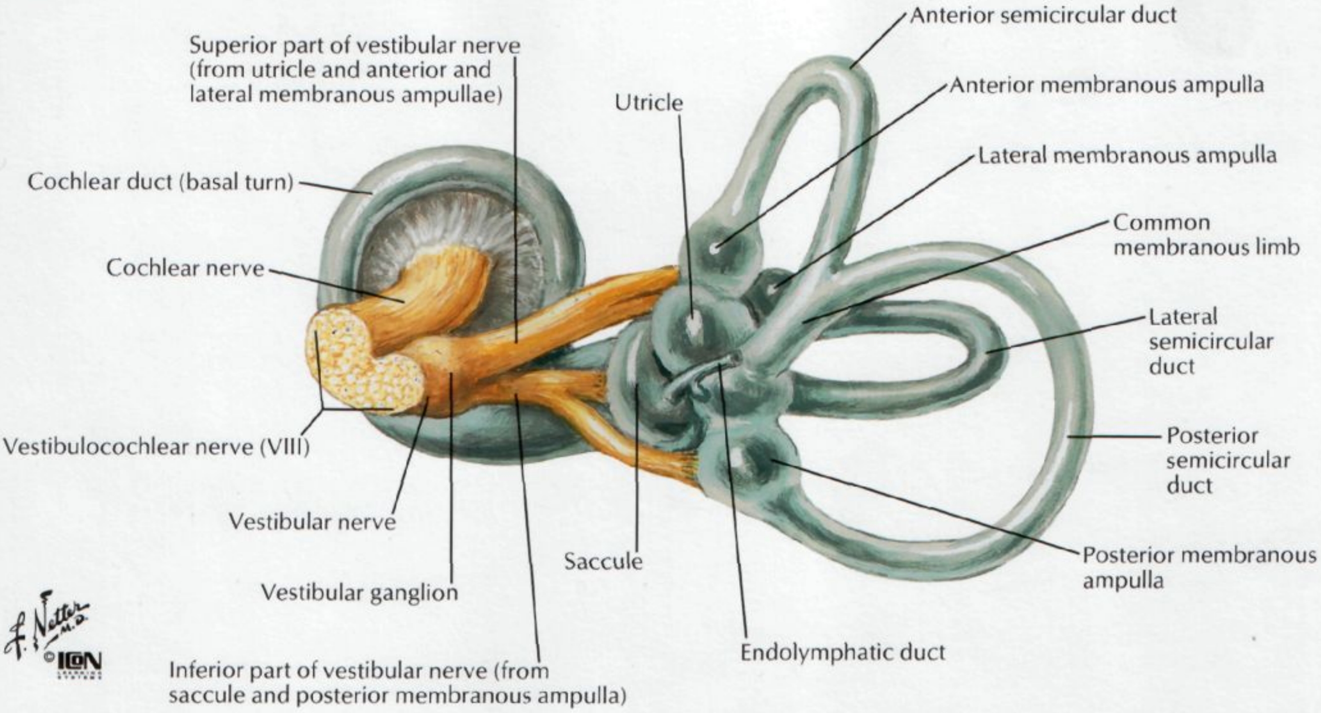
Right bony labyrinth (otic capsule), anterolateral view: surrounding cancellous bone removed



Dissected right bony labyrinth (otic capsule): membranous labyrinth removed



Right membranous labyrinth with nerves: posteromedial view


Anterior semicircular duct
Superior part of vestibular nerve (from utricle and anterior and lateral membranous ampullae)
Utricle
Anterior membranous ampulla
Lateral membranous ampulla
Cochlear duct (basal turn)
Common membranous limb
Cochlear nerve
Lateral semicircular duct
Posterior semicircular duct
Vestibulocochlear nerve (VIII)
Vestibular nerve
Saccule
Posterior membranous ampulla
Vestibular ganglion
Endolymphatic duct
Inferior part of vestibular nerve (from saccule and posterior membranous ampulla)
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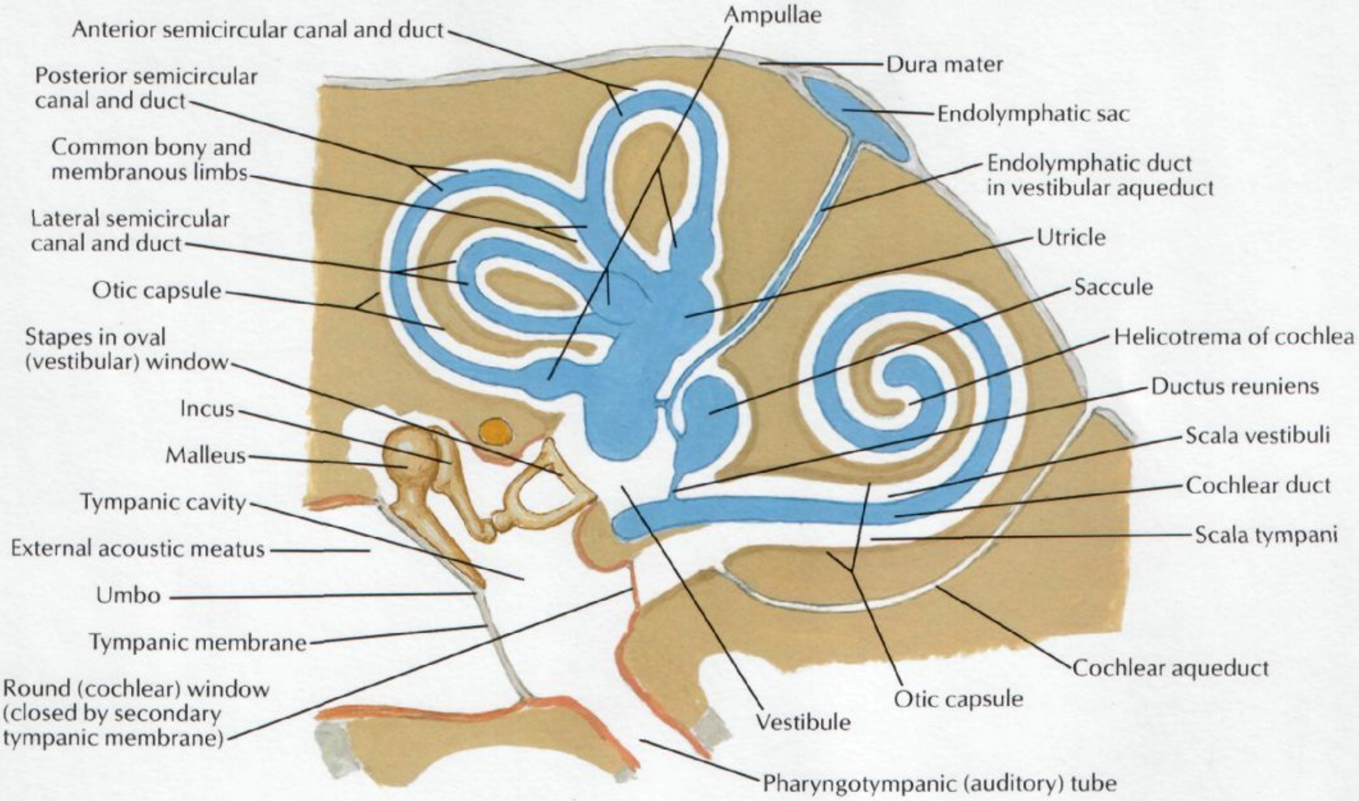
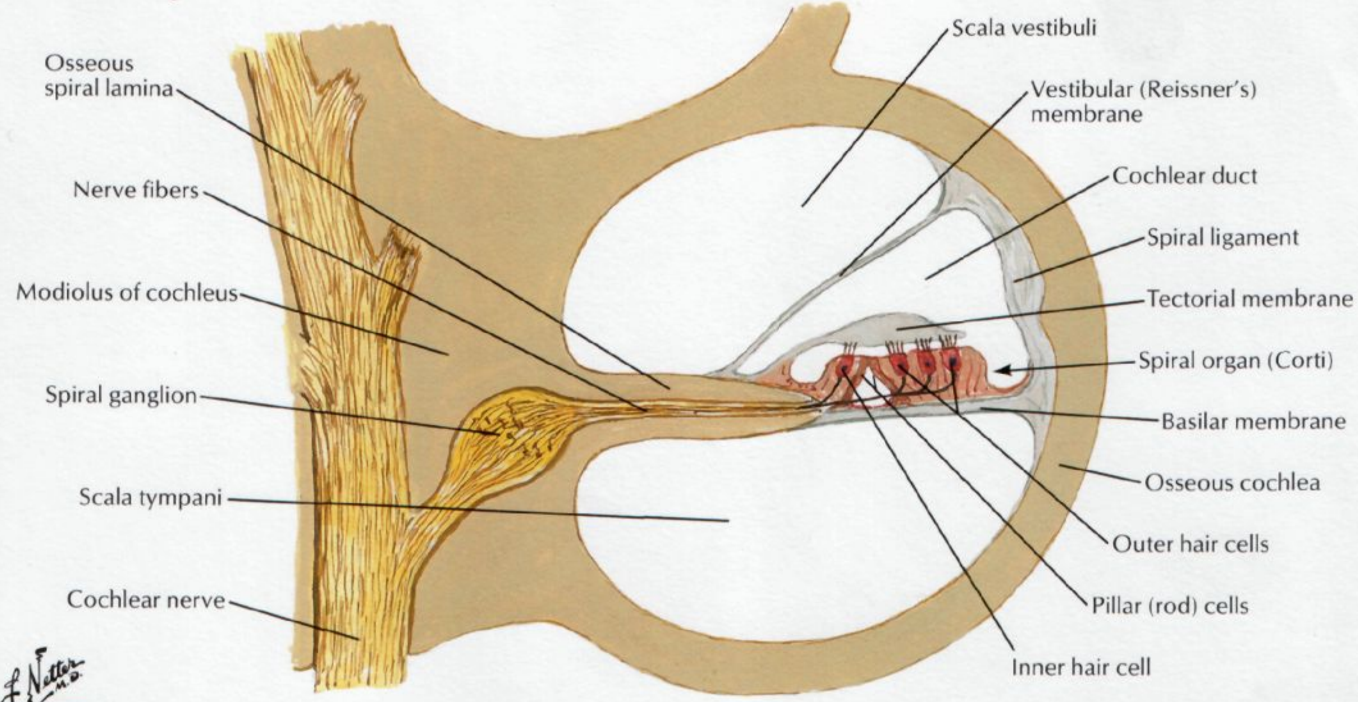
Bony and Membranous Labyrinths (continued)

Bony and membranous labyrinths: schema


Anterior semicircular canal and duct
Ampullae
Dura mater
Posterior semicircular canal and duct
Endolymphatic sac
Common bony and membranous limbs
Endolymphatic duct in vestibular aqueduct
Lateral semicircular canal and duct
Utricle
Otic capsule
Saccule
Stapes in oval (vestibular) window
Helicotrema of cochlea
Incus
Ductus reuniens
Malleus
Scala vestibuli
Tympanic cavity
Cochlear duct
External acoustic meatus
Scala tympani
Umbo
Tympanic membrane
Cochlear aqueduct
Round (cochlear) window (closed by secondary tympanic membrane)
Otic capsule
Vestibule
Pharyngotympanic (auditory) tube

Section through turn of cochlea



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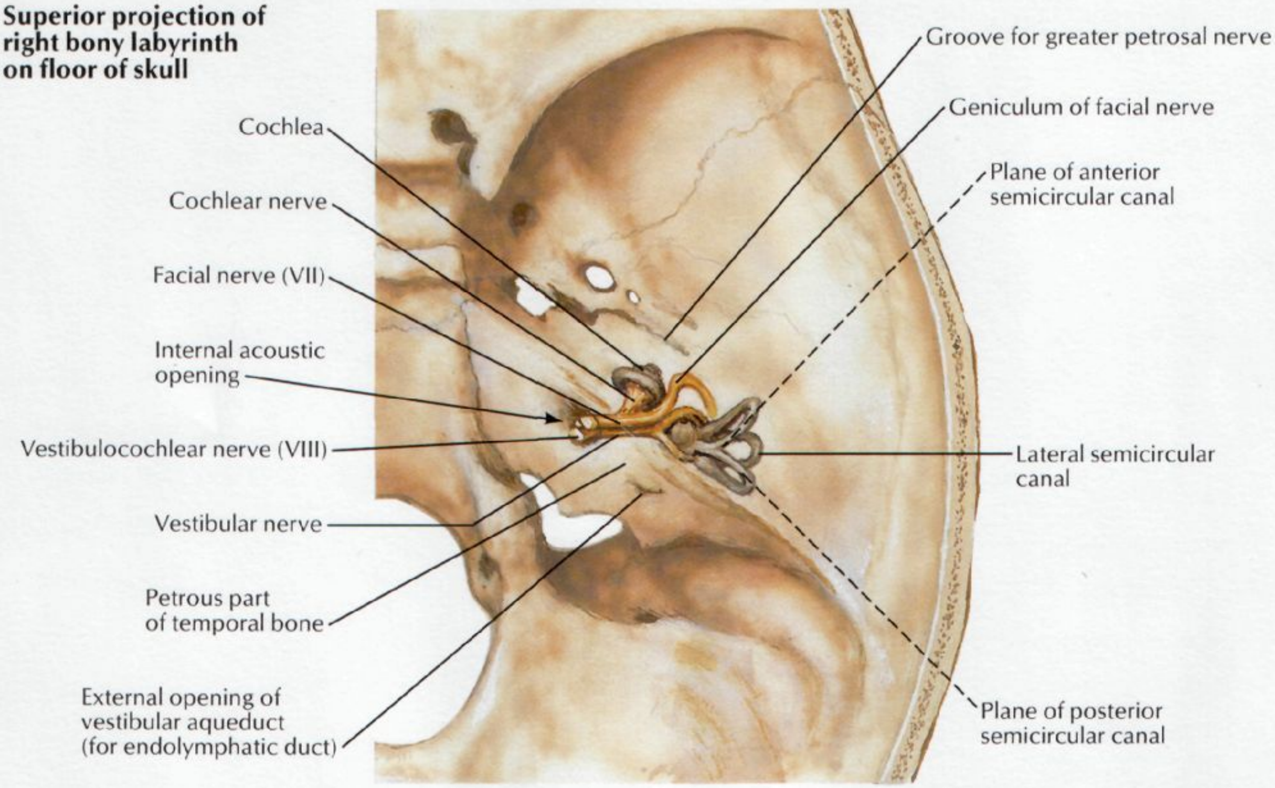
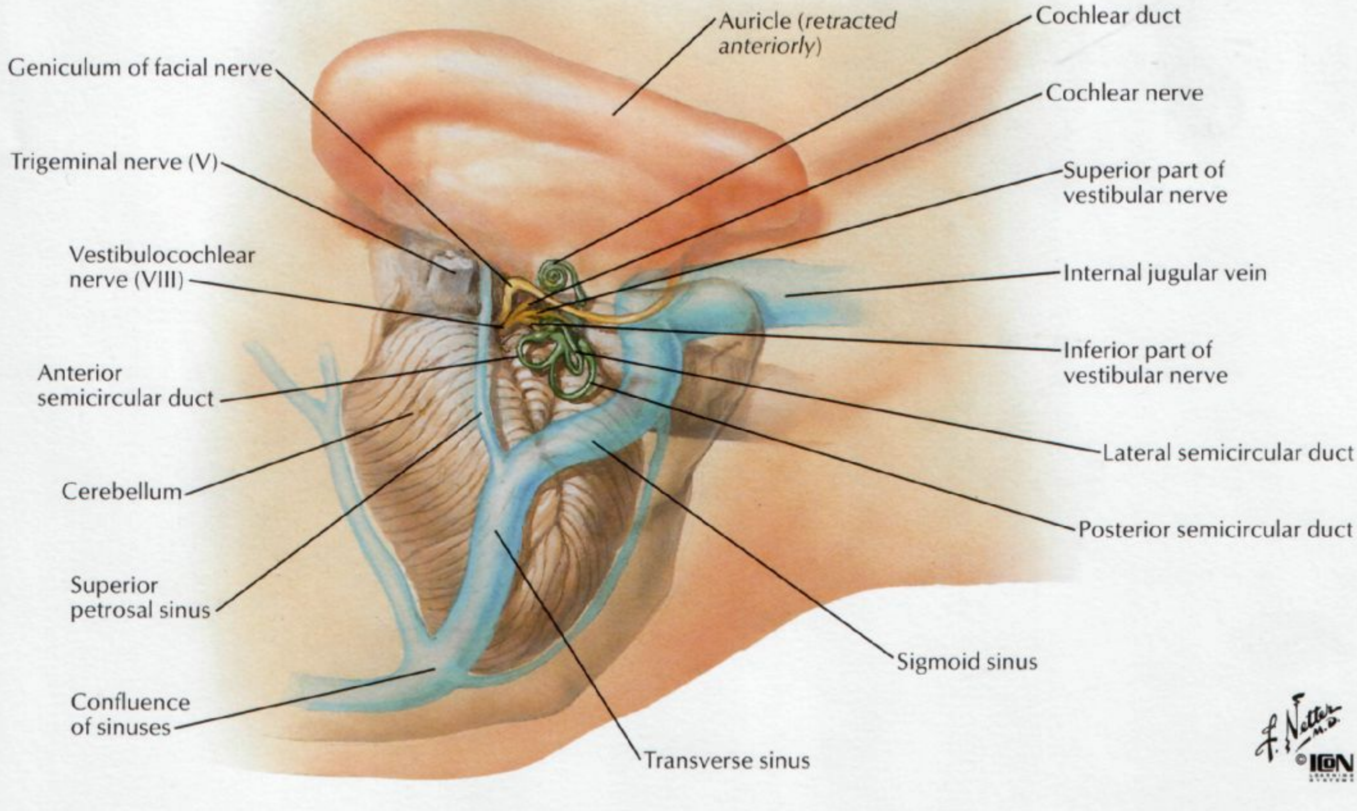
Orientation of Labyrinth in Skull

Superior projection of right bony labyrinth on floor of skull


Cochlea
Cochlear nerve
Facial nerve (VII)
Internal acoustic opening
Vestibulocochlear nerve (VIII)
Vestibular nerve
Petrous part of temporal bone
External opening of vestibular aqueduct (for endolymphatic duct)
Groove for greater petrosal nerve
Geniculum of facial nerve
Plane of anterior semicircular canal
Lateral semicircular canal
Plane of posterior semicircular canal

Lateral projection of right membranous labyrinth


Geniculum of facial nerve
Trigeminal nerve (V)
Vestibulocochlear nerve (VIII)
Anterior semicircular duct
Cerebellum
Superior petrosal sinus
Confluence of sinuses
Transverse sinus
Auricle (*retracted anteriorly*)
Cochlear duct
Cochlear nerve
Superior part of vestibular nerve
Internal jugular vein
Inferior part of vestibular nerve
Lateral semicircular duct
Posterior semicircular duct
Sigmoid sinus
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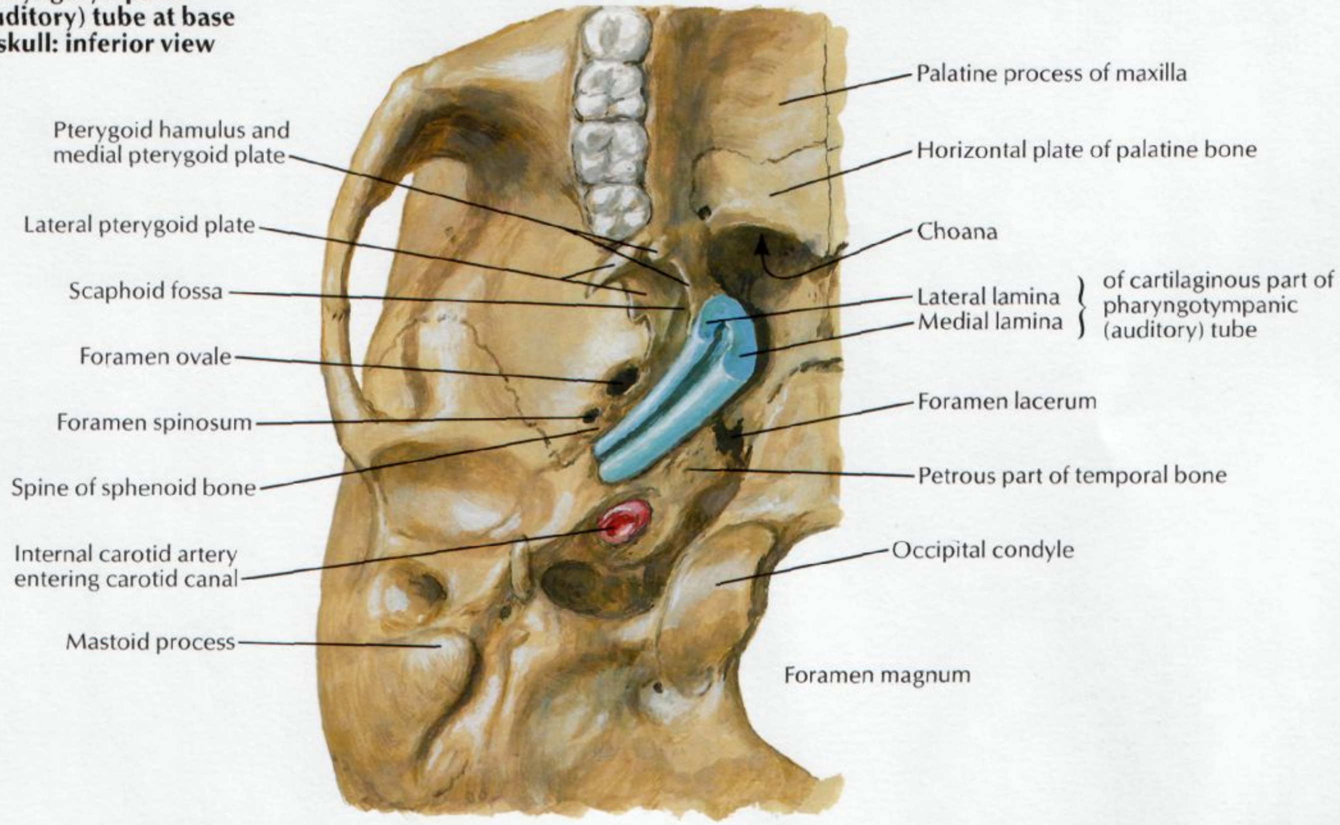
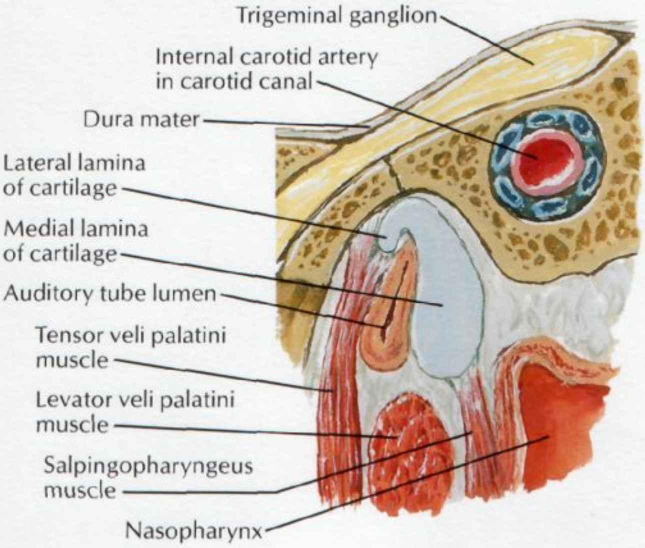
Pharyngotympanic (Auditory) Tube

SEE ALSO PLATES 48, 51, 61

Cartilaginous part of pharyngotympanic (auditory) tube at base of skull: inferior view

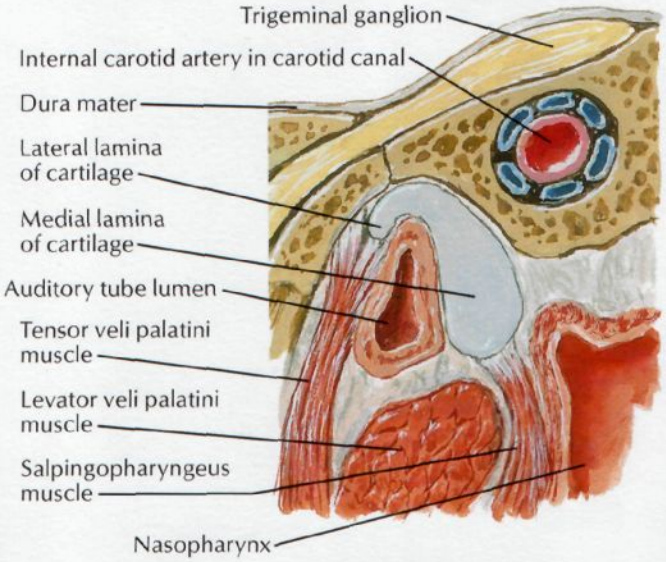

Pterygoid hamulus and medial pterygoid plate
Lateral pterygoid plate
Scaphoid fossa
Foramen ovale
Foramen spinosum
Spine of sphenoid bone
Internal carotid artery entering carotid canal
Mastoid process
Palatine process of maxilla
Horizontal plate of palatine bone
Choana
Lateral lamina
Medial lamina
of cartilaginous part of pharyngotympanic (auditory) tube
Foramen lacerum
Petrous part of temporal bone
Occipital condyle
Foramen magnum

Section through cartilaginous part of pharyngotympanic (auditory) tube, with tube closed


Trigeminal ganglion
Internal carotid artery in carotid canal
Dura mater
Lateral lamina of cartilage
Medial lamina of cartilage
Auditory tube lumen
Tensor veli palatini muscle
Levator veli palatini muscle
Salpingopharyngeus muscle
Nasopharynx

Pharyngotympanic (auditory) tube closed by elastic recoil of cartilage, tissue turgidity and tension of salpingopharyngeus muscles

Section through cartilaginous part of pharyngotympanic (auditory) tube, with tube open

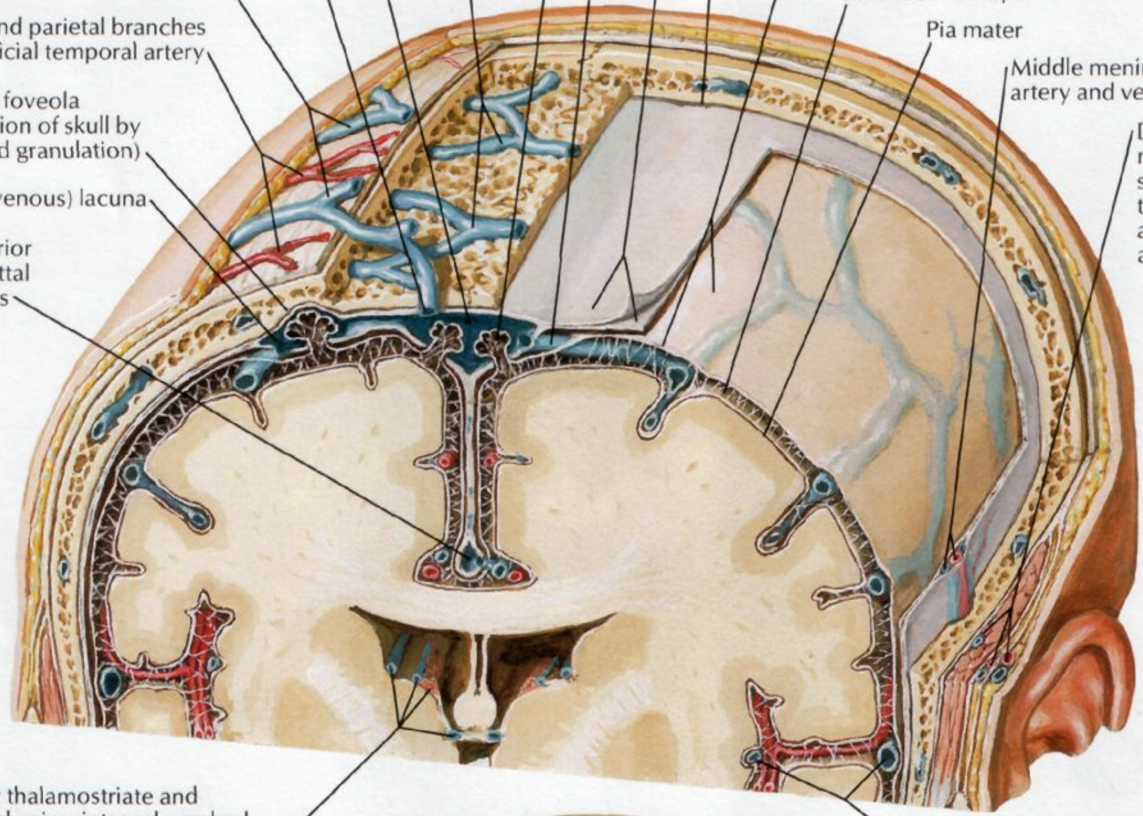

Trigeminal ganglion
Internal carotid artery in carotid canal
Dura mater
Lateral lamina of cartilage
Medial lamina of cartilage
Auditory tube lumen
Tensor veli palatini muscle
Levator veli palatini muscle
Salpingopharyngeus muscle
Nasopharynx

Lumen opened chiefly when attachment of tensor veli palatini muscle pulls wall of tube laterally during swallowing

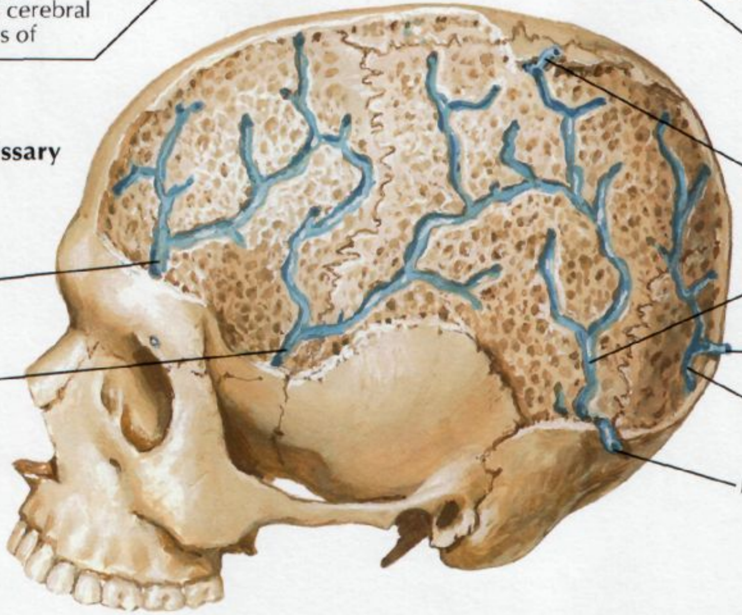
Meninges and Diploic Veins

SEE ALSO PLATE 19

Coronal dissection


Diploic veins
Arachnoid granulation
Superior sagittal sinus
Cerebral vein penetrates subdural space to enter sinus
Dura mater (periosteal and meningeal layers)
Emissary vein
Dura-skull interface (site of epidural hematoma)
Frontal and parietal tributaries of superficial temporal vein
Arachnoid
Subarachnoid space
Frontal and parietal branches of superficial temporal artery
Pia mater
Middle meningeal artery and vein
Granular foveola (indentation of skull by arachnoid granulation)
Deep, middle and superficial temporal arteries and veins
Lateral (venous) lacuna
Inferior sagittal sinus
Superior thalamostriate and choroidal veins, internal cerebral veins and choroid plexus of lateral ventricle
Deep and superficial middle cerebral veins

Diploic and emissary veins of skull



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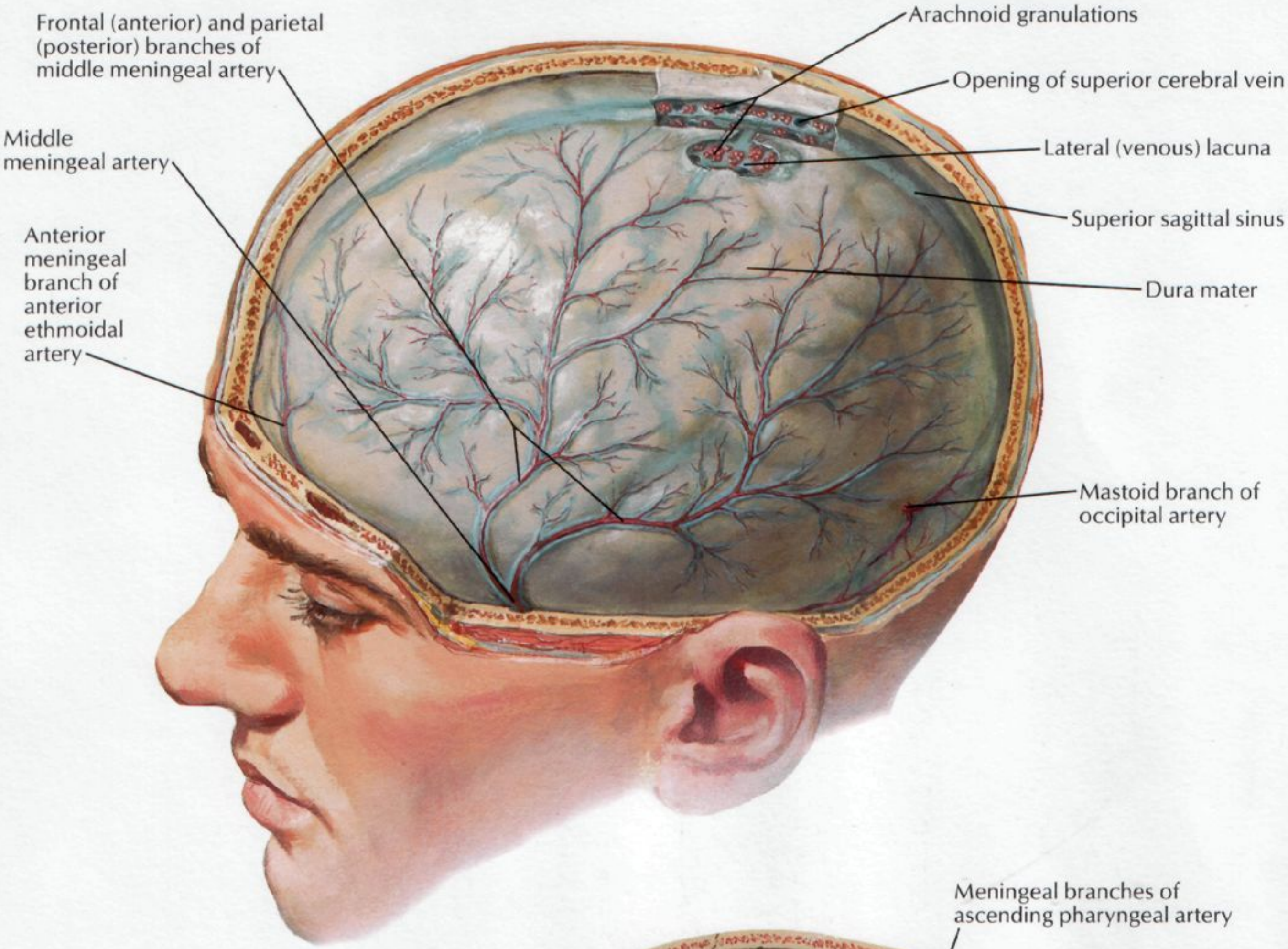
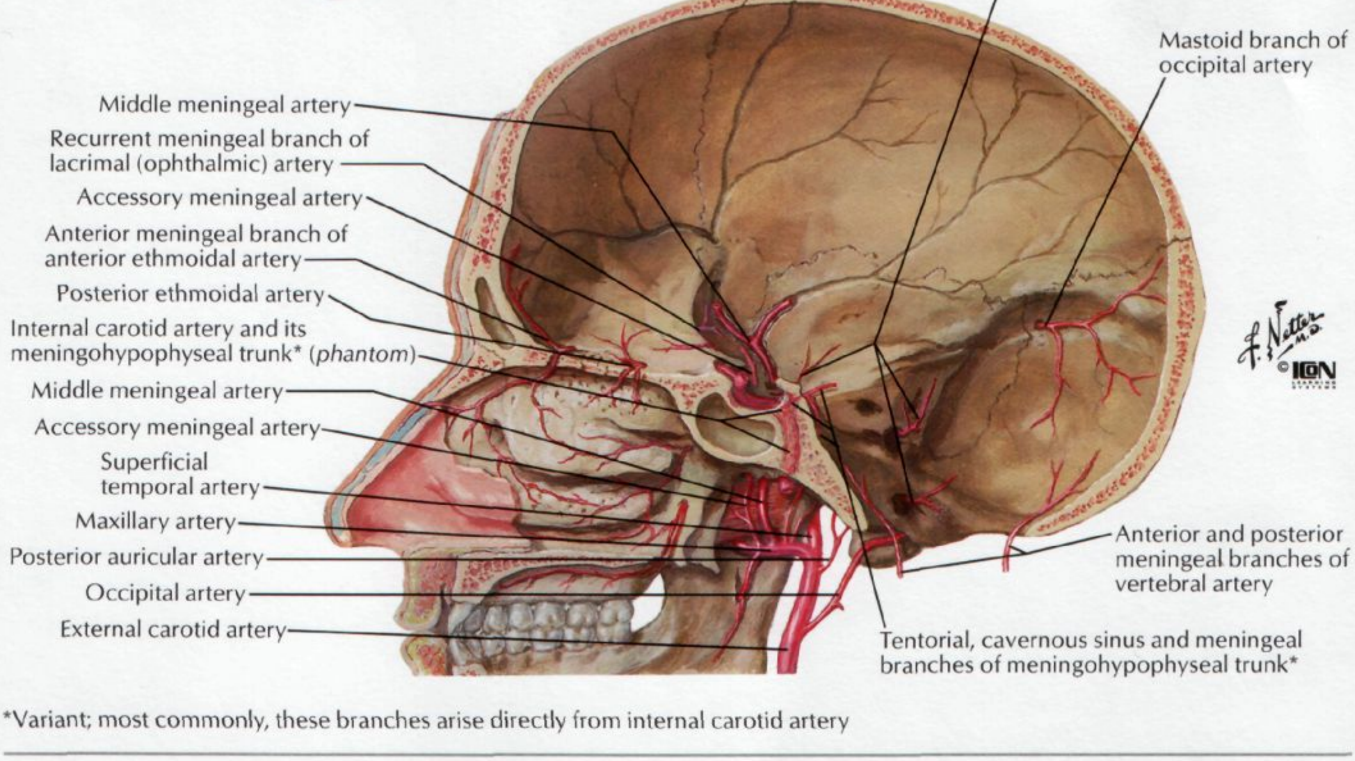
Meningeal Arteries

SEE ALSO PLATES 36, 130


Frontal (anterior) and parietal (posterior) branches of middle meningeal artery
Arachnoid granulations
Opening of superior cerebral vein
Middle meningeal artery
Lateral (venous) lacuna
Superior sagittal sinus
Anterior meningeal branch of anterior ethmoidal artery
Dura mater
Mastoid branch of occipital artery


Meningeal branches of ascending pharyngeal artery
Mastoid branch of occipital artery
Middle meningeal artery
Recurrent meningeal branch of lacrimal (ophthalmic) artery
Accessory meningeal artery
Anterior meningeal branch of anterior ethmoidal artery
Posterior ethmoidal artery
Internal carotid artery and its meningohypophyseal trunk* (*phantom*)
Middle meningeal artery
Accessory meningeal artery
Superficial temporal artery
Maxillary artery
Posterior auricular artery
Occipital artery
External carotid artery
Anterior and posterior meningeal branches of vertebral artery
Tentorial, cavernous sinus and meningeal branches of meningohypophyseal trunk*
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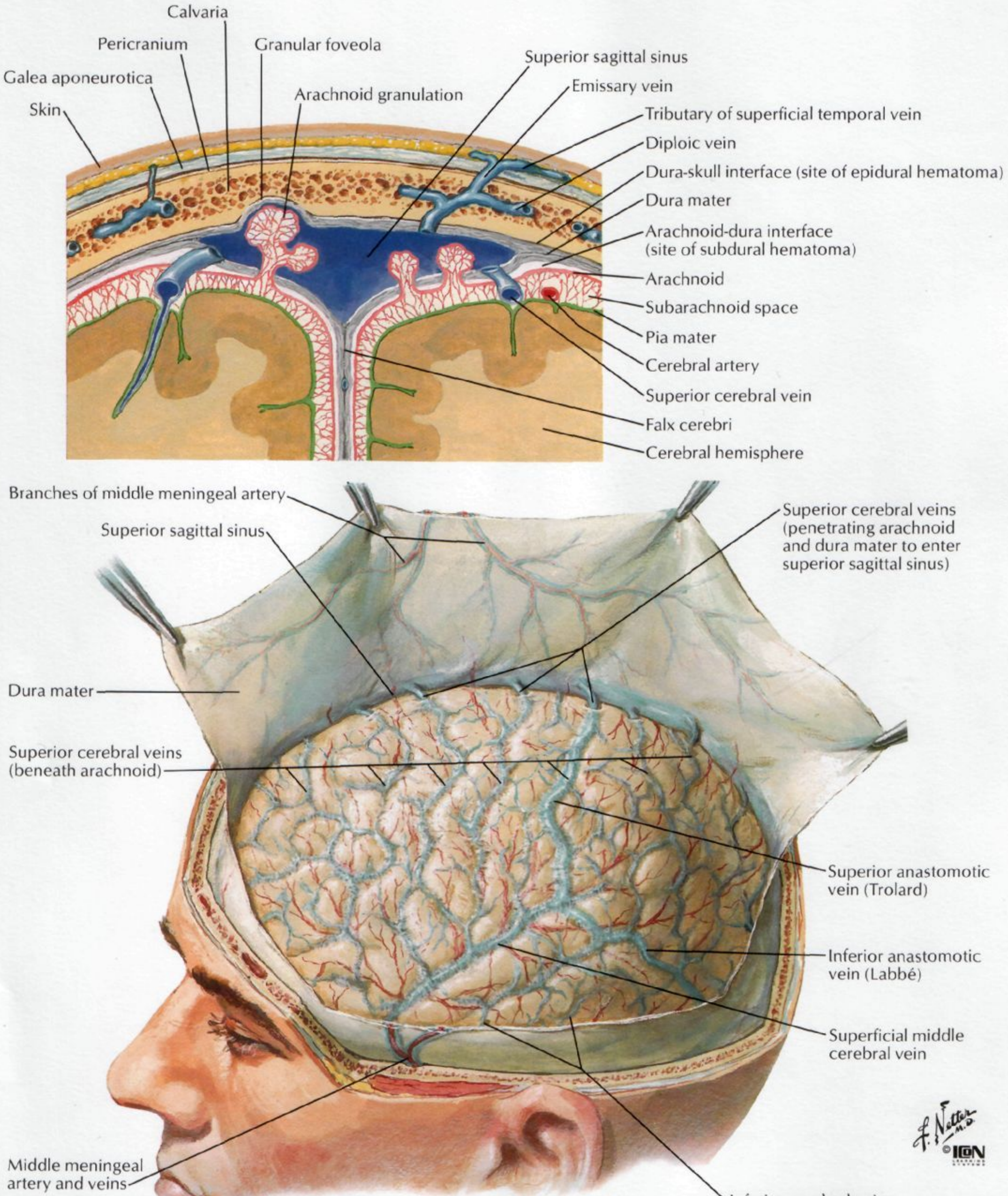
*Variant; most commonly, these branches arise directly from internal carotid artery

Meninges and Superficial Cerebral Veins

FOR DEEP VEINS OF BRAIN SEE PLATE 138


Calvaria
Pericranium
Granular foveola
Galea aponeurotica
Arachnoid granulation
Skin
Superior sagittal sinus
Emissary vein
Tributary of superficial temporal vein
Diploic vein
Dura-skull interface (site of epidural hematoma)
Dura mater
Arachnoid-dura interface (site of subdural hematoma)
Arachnoid
Subarachnoid space
Pia mater
Cerebral artery
Superior cerebral vein
Falx cerebri
Cerebral hemisphere
Branches of middle meningeal artery
Superior sagittal sinus
Superior cerebral veins (penetrating arachnoid and dura mater to enter superior sagittal sinus)
Dura mater
Superior cerebral veins (beneath arachnoid)
Superior anastomotic vein (Trolard)
Inferior anastomotic vein (Labbé)
Superficial middle cerebral vein
F. Netter M.D.
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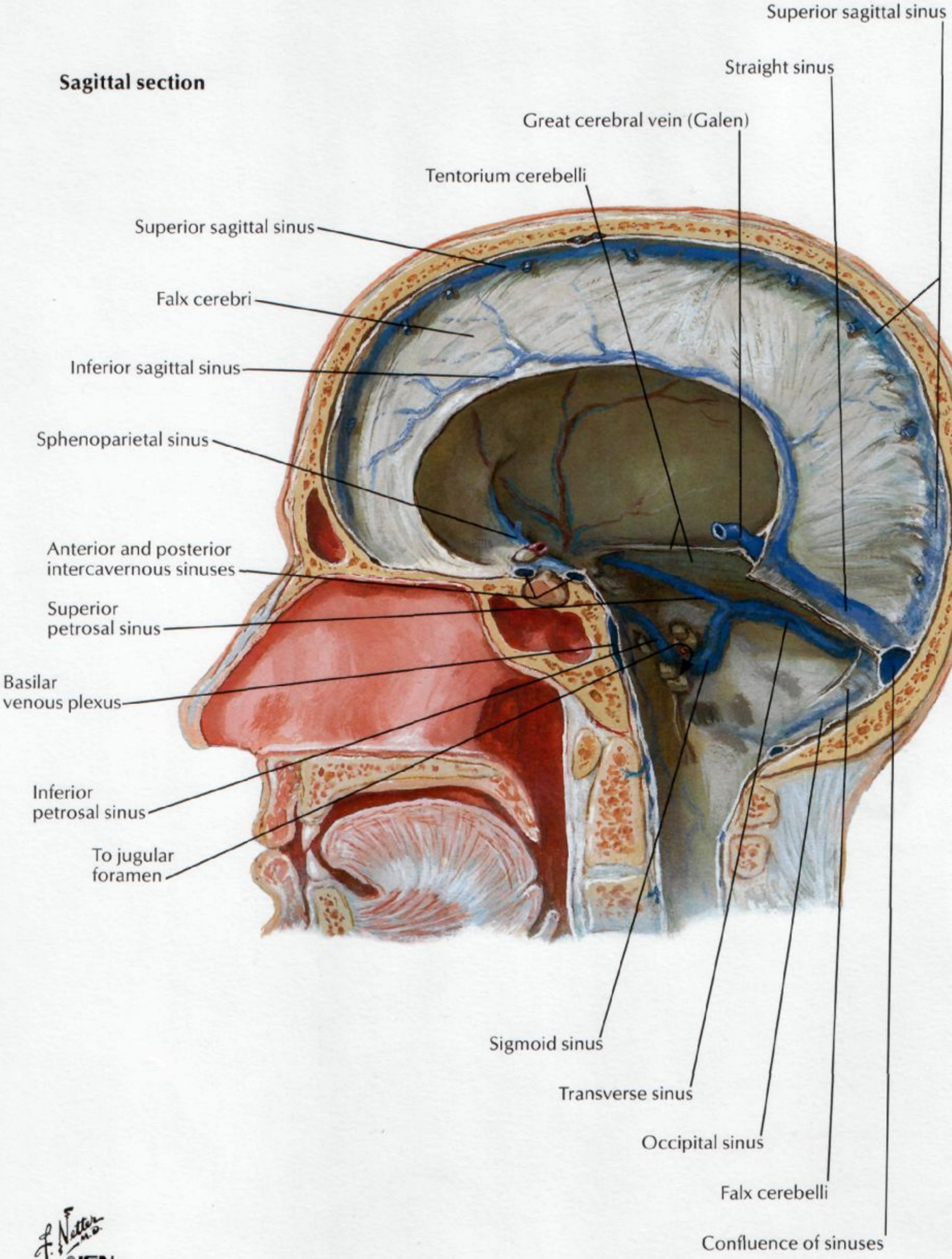
Middle meningeal artery and veins
Inferior cerebral veins (beneath arachnoid)

Sagittal section



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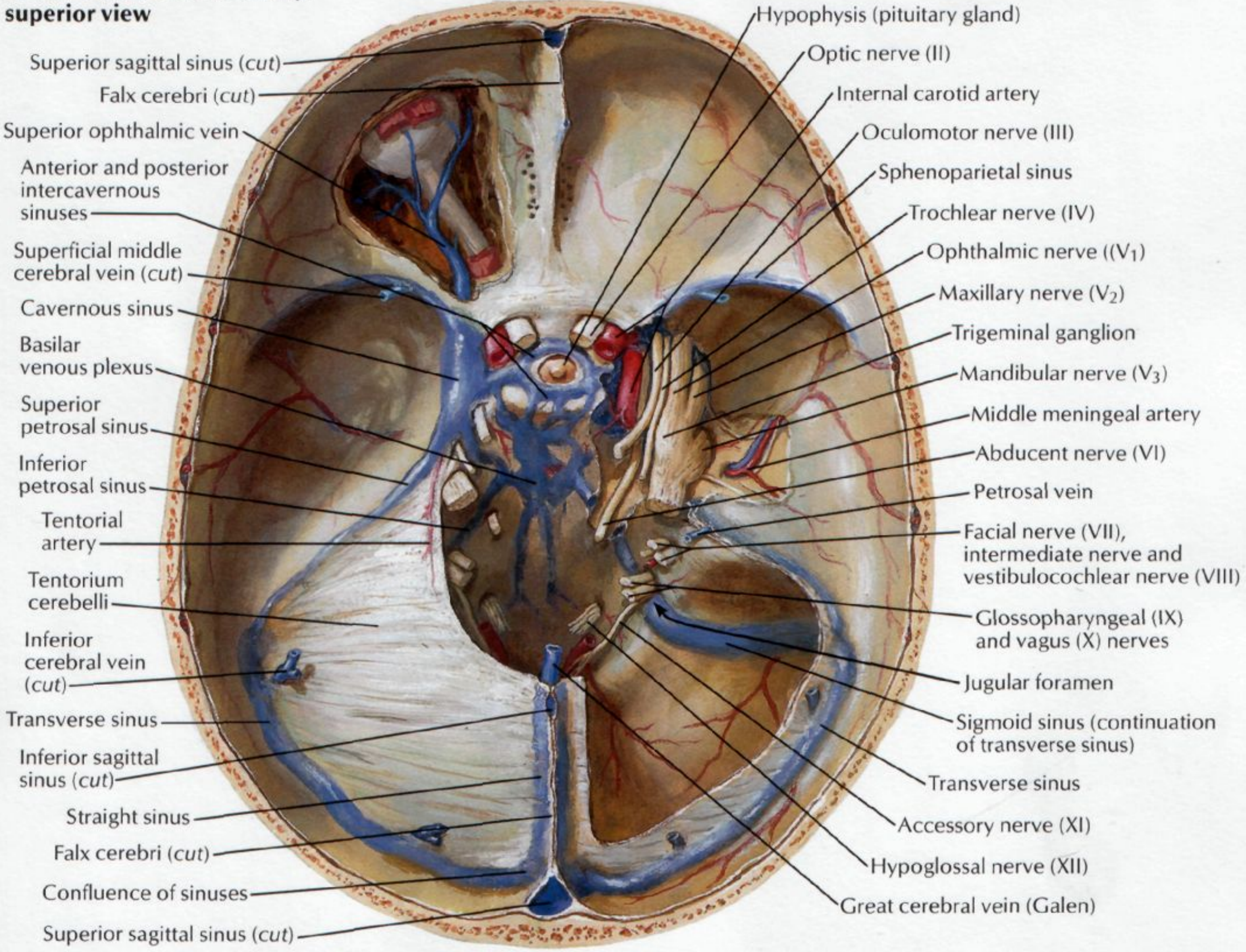
Dural Venous Sinuses (continued)

SEE ALSO PLATE 81

Skull sectioned horizontally: superior view



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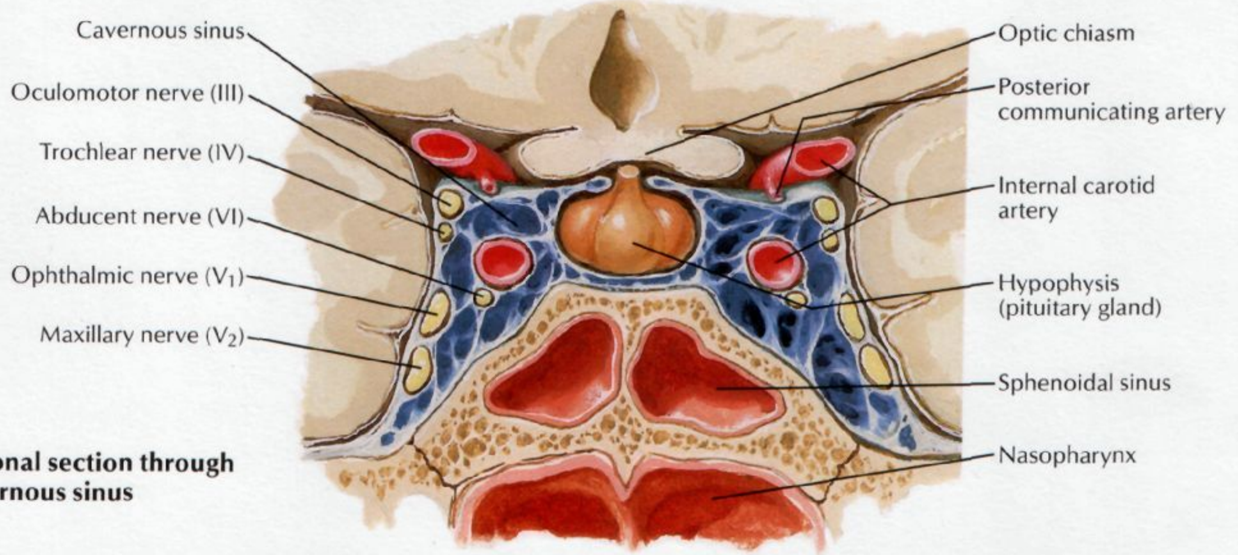
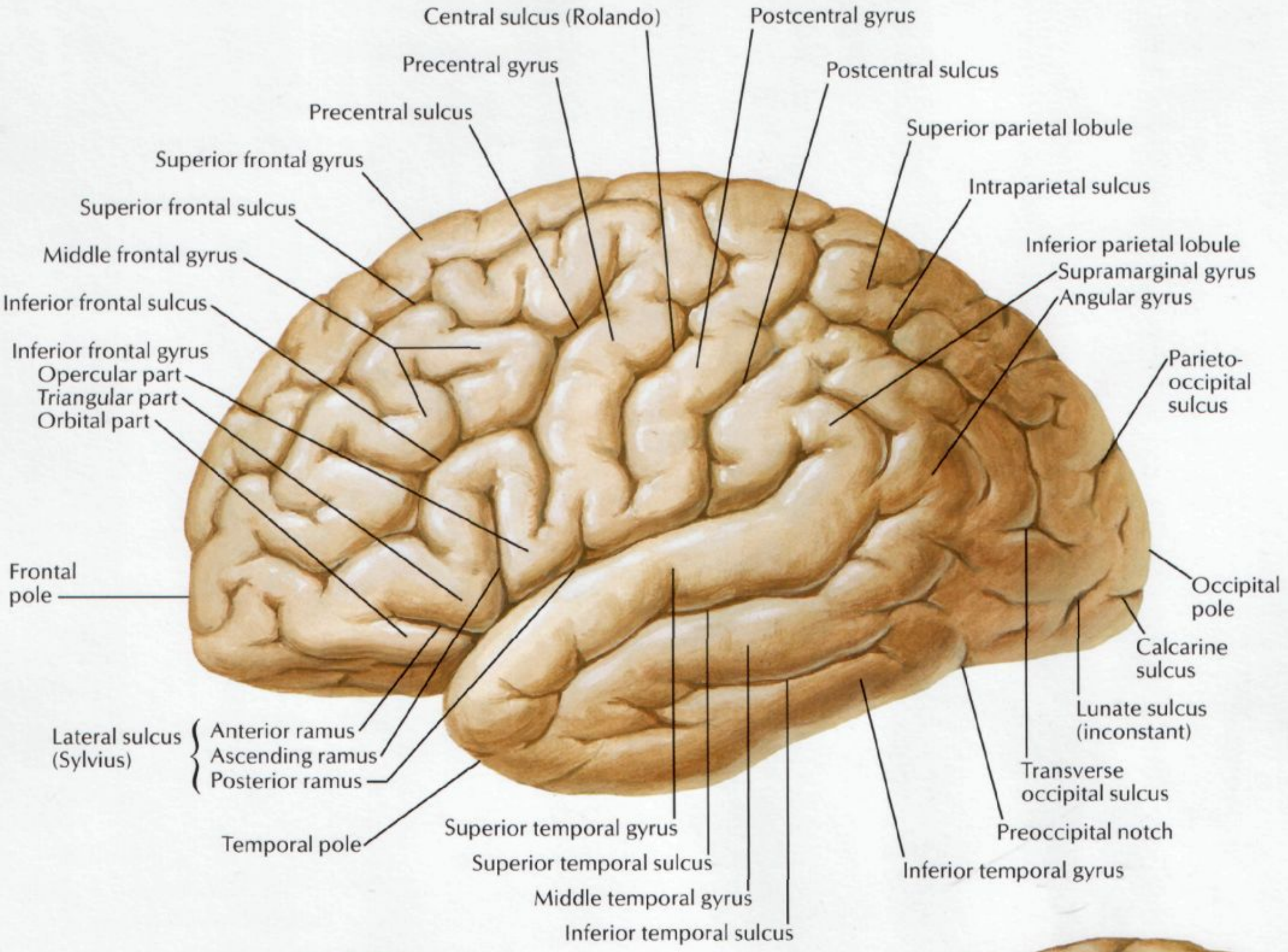
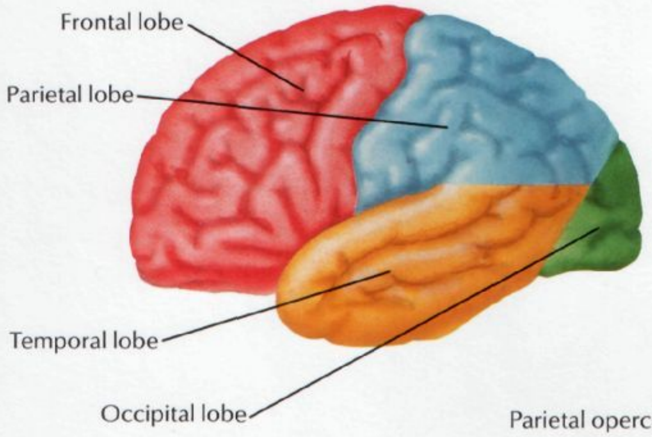
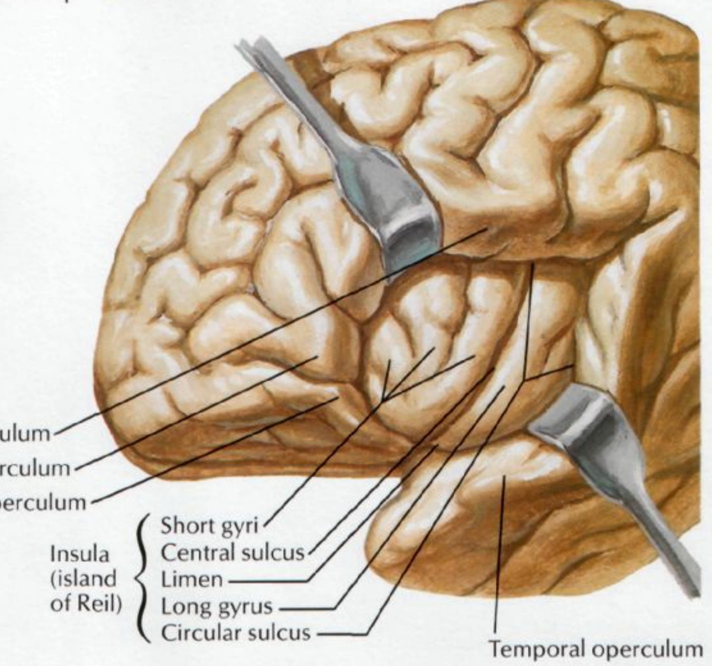


Coronal section through cavernous sinus







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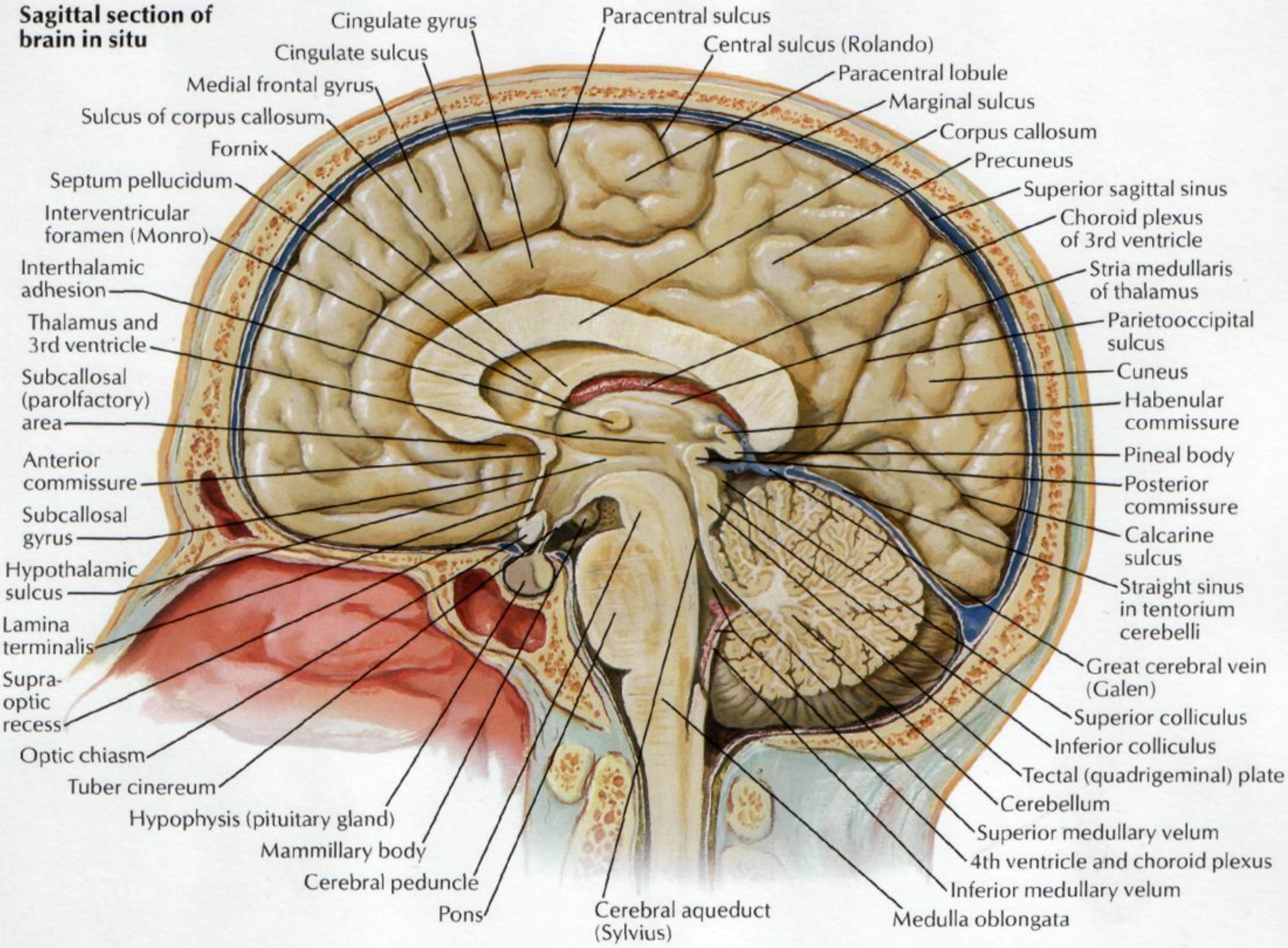
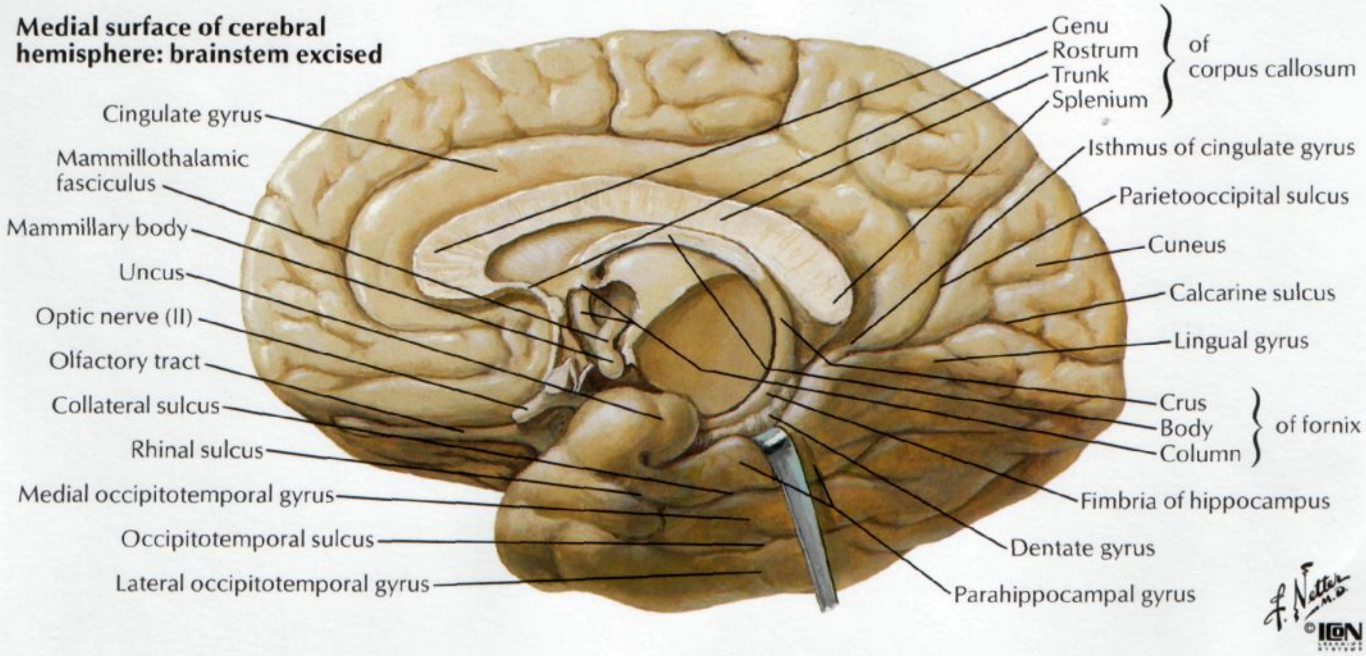
Cerebrum: Medial Views

FOR HYPOPHYSIS SEE PLATE 140

Sagittal section of brain in situ

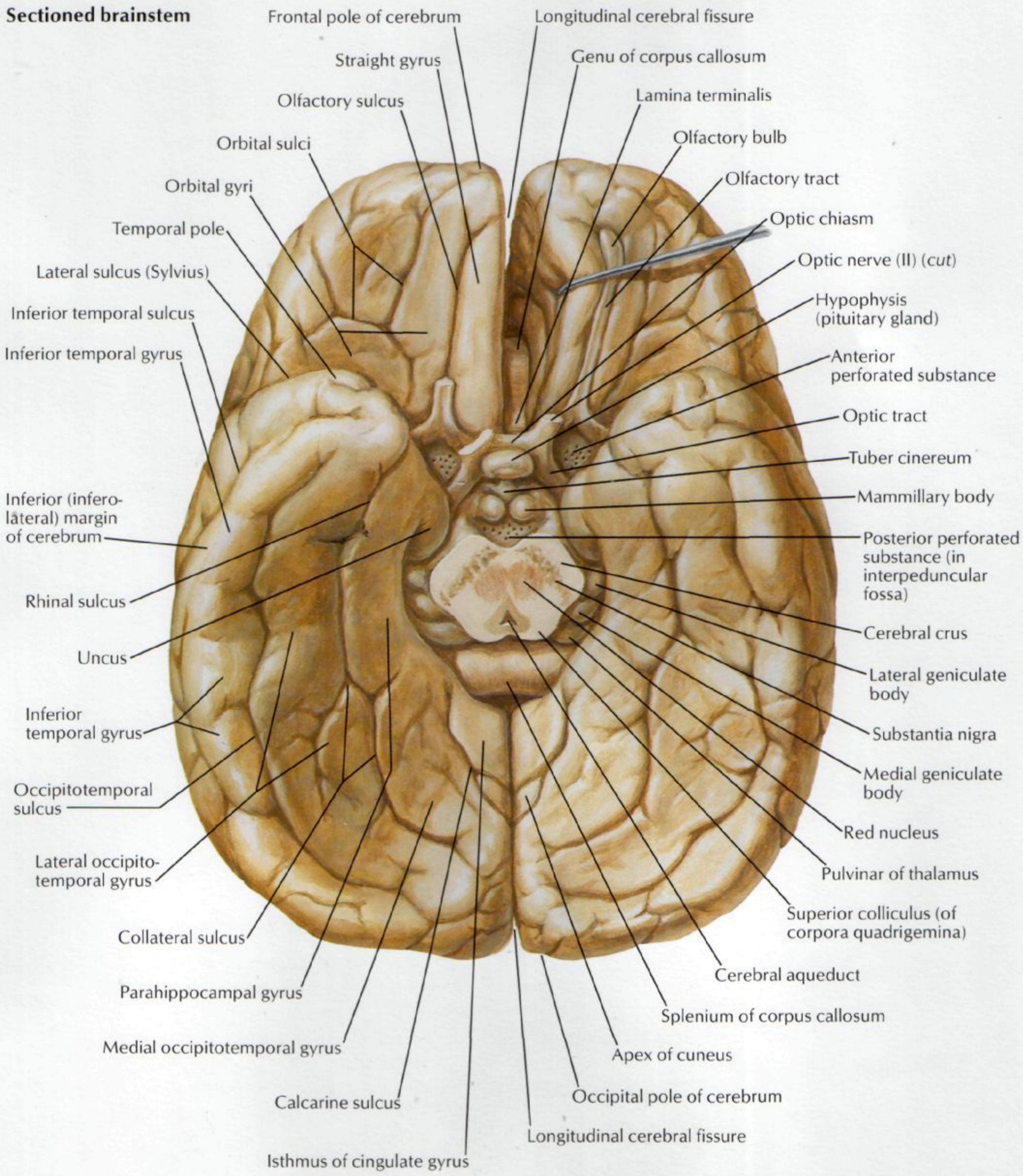


Medial surface of cerebral hemisphere: brainstem excised



Cerebrum: Inferior View

FOR HYPOPHYSIS SEE PLATE 140

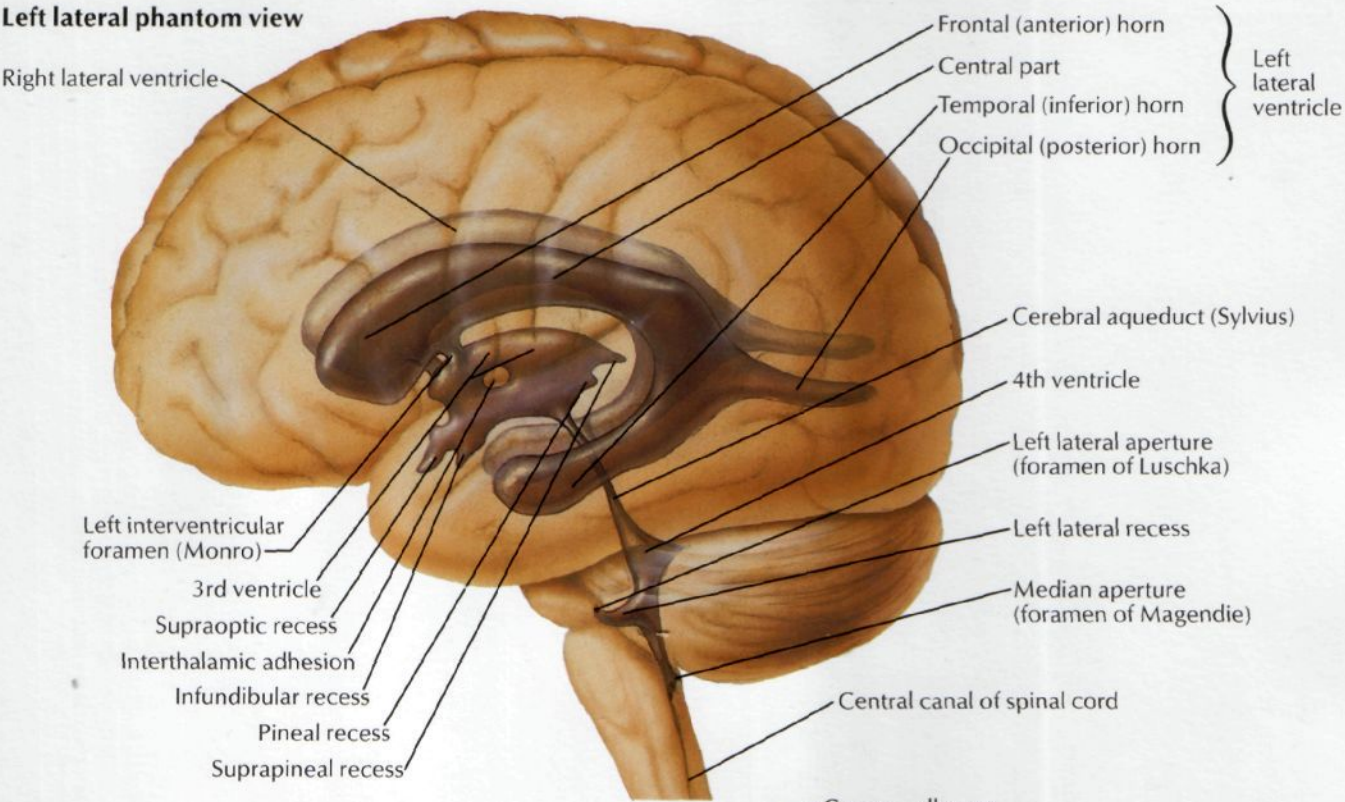


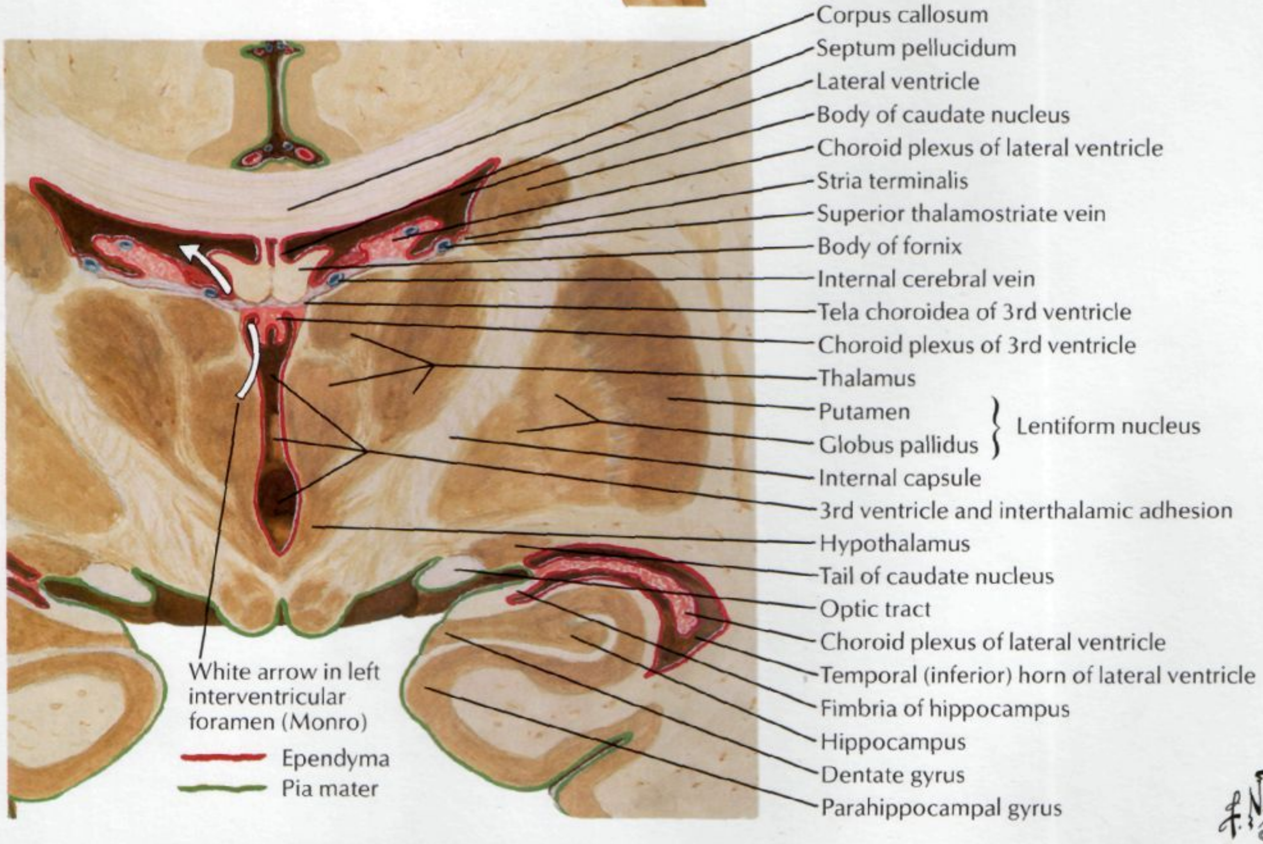
Sectioned brainstem

F. Netter M.D.

Ventricles of Brain

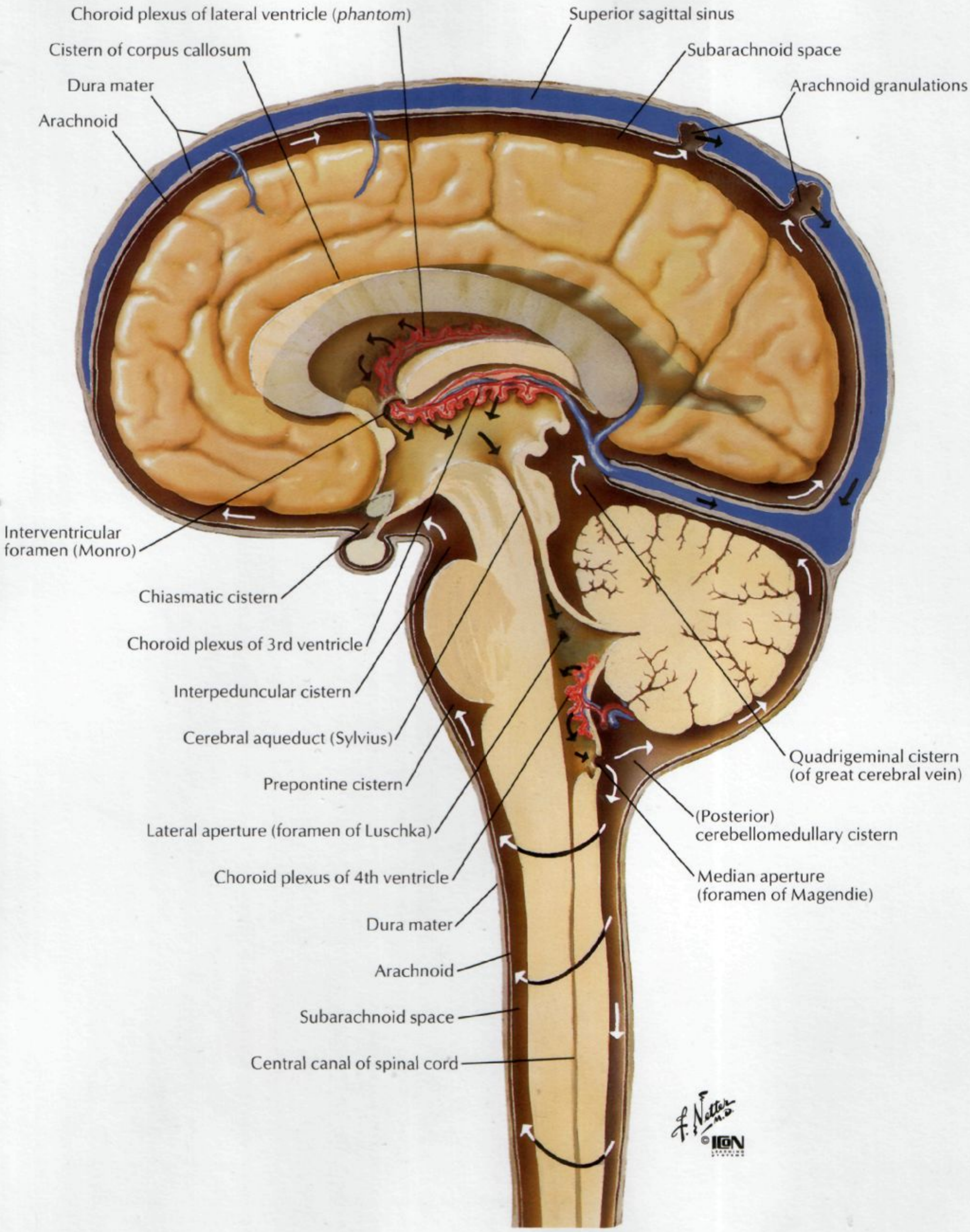
Left lateral phantom view





Coronal section of brain: posterior view

Circulation of Cerebrospinal Fluid


Choroid plexus of lateral ventricle (*phantom*)
Cistern of corpus callosum
Dura mater
Arachnoid
Superior sagittal sinus
Subarachnoid space
Arachnoid granulations
Interventricular foramen (Monro)
Chiasmatic cistern
Choroid plexus of 3rd ventricle
Interpeduncular cistern
Cerebral aqueduct (Sylvius)
Prepontine cistern
Lateral aperture (foramen of Luschka)
Choroid plexus of 4th ventricle
Dura mater
Arachnoid
Subarachnoid space
Central canal of spinal cord
Quadrigeminal cistern (of great cerebral vein)
(Posterior) cerebellomedullary cistern
Median aperture (foramen of Magendie)
F. Netter M.D.
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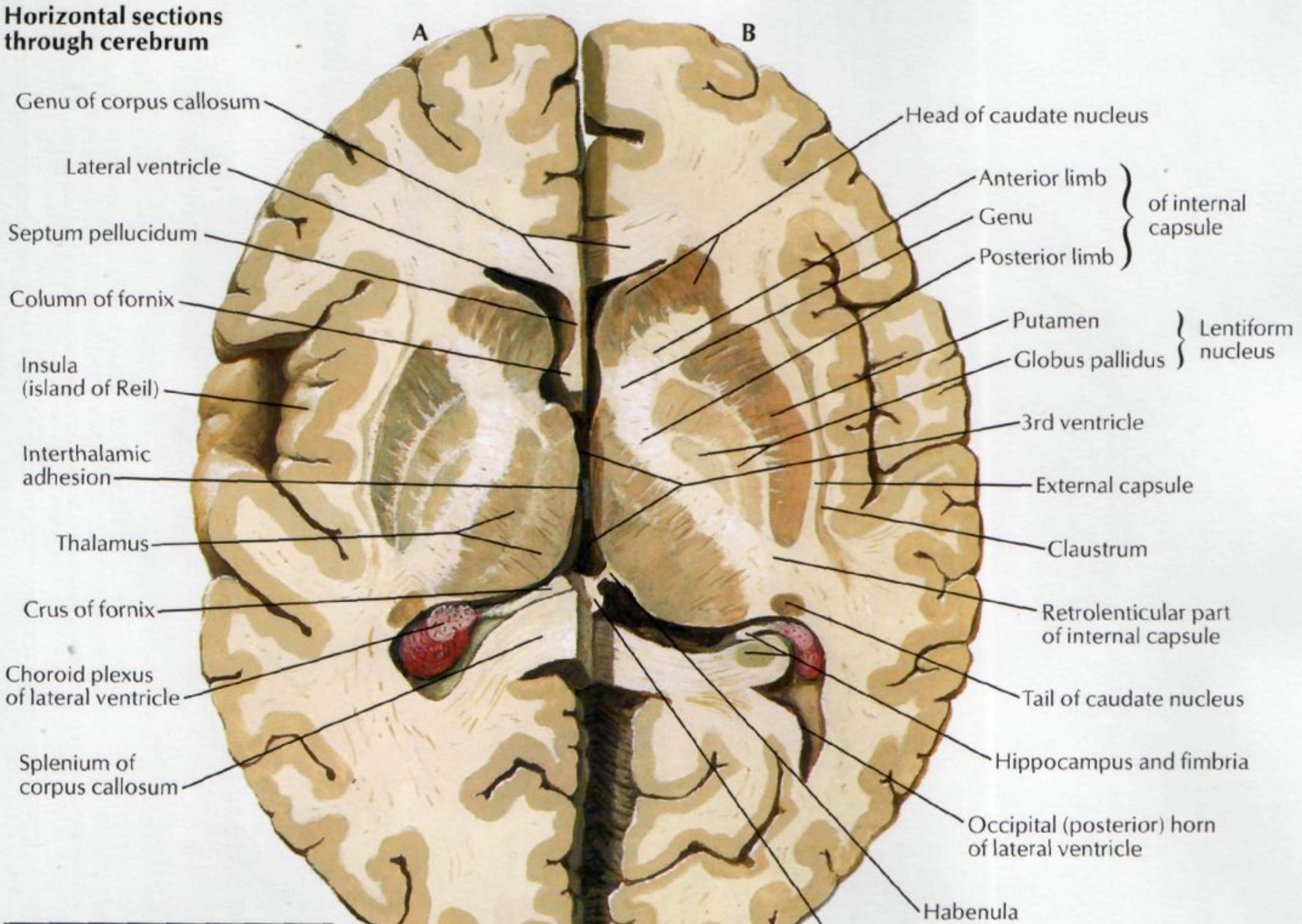
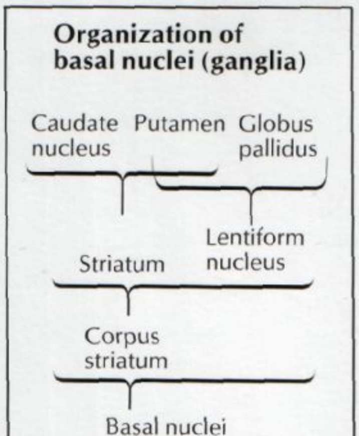
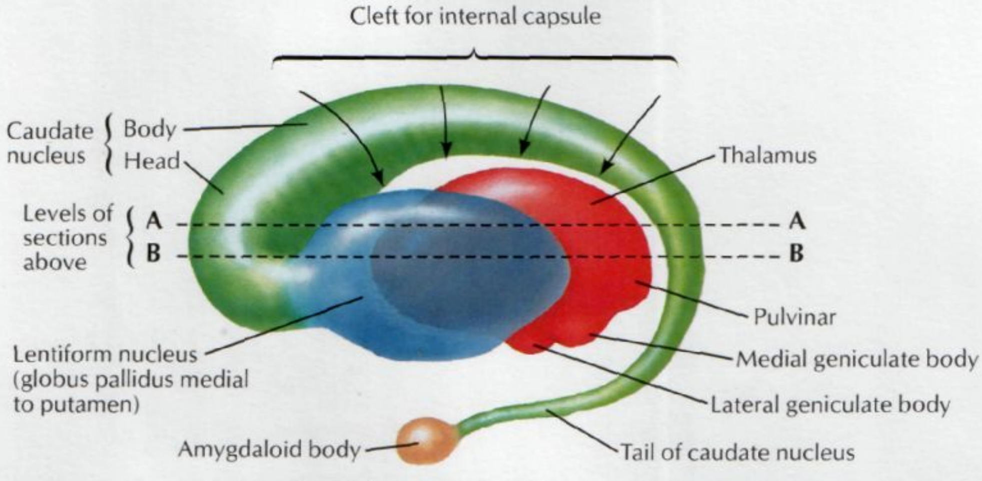
Basal Nuclei (Ganglia)

Horizontal sections through cerebrum



Organization of basal nuclei (ganglia)





Interrelationship of thalamus, lentiform nucleus, caudate nucleus and amygdaloid body (schema): left lateral view

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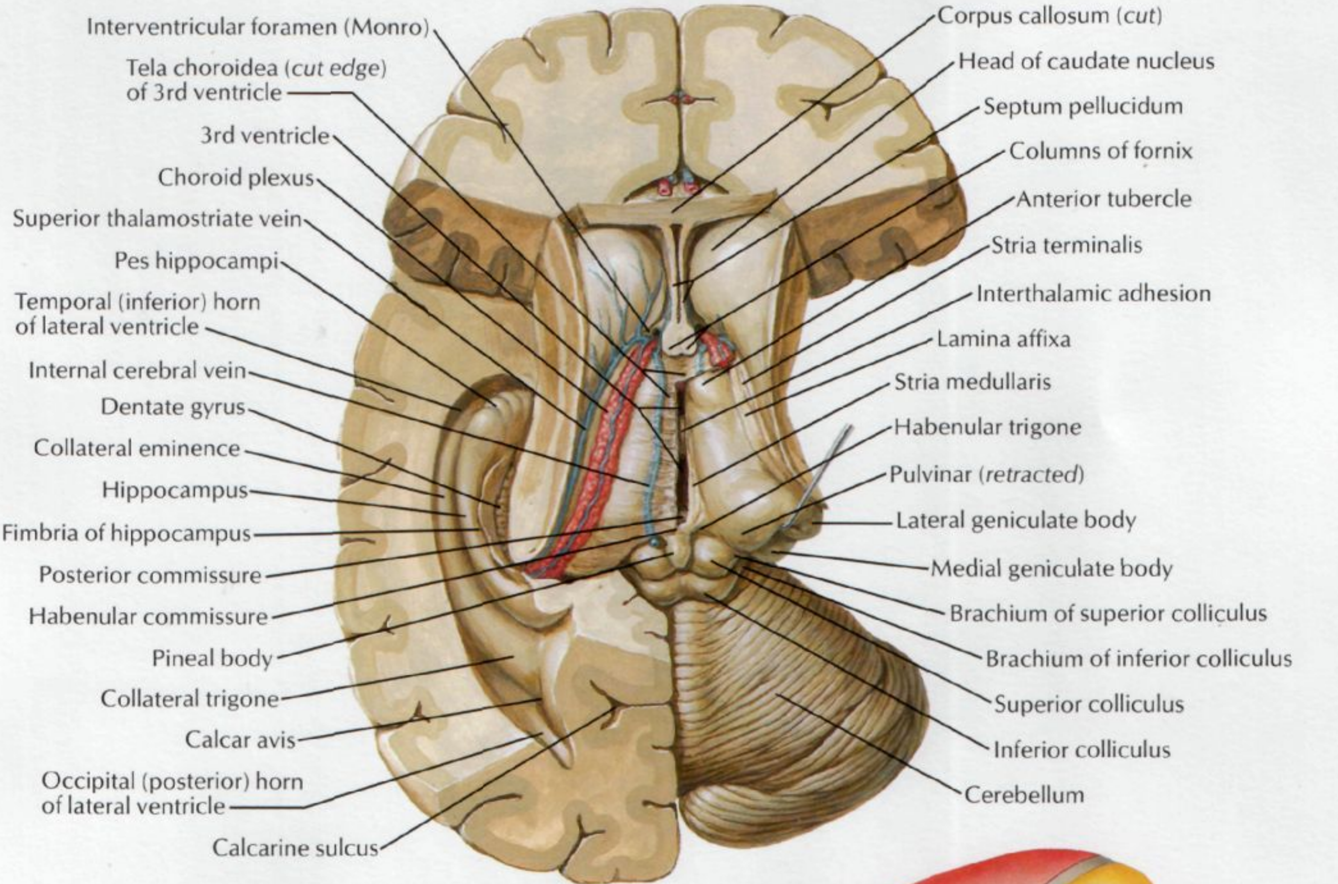
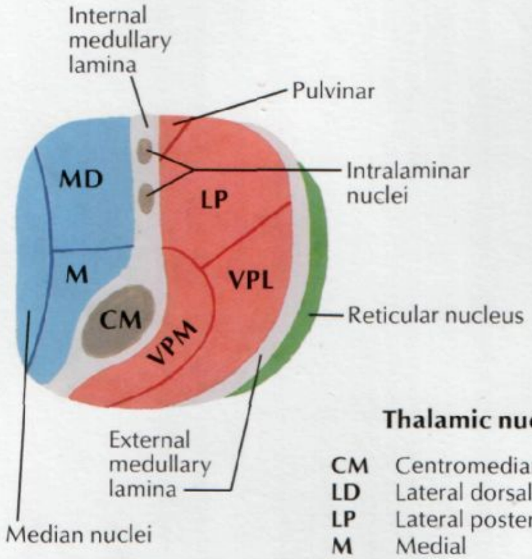
Thalamus



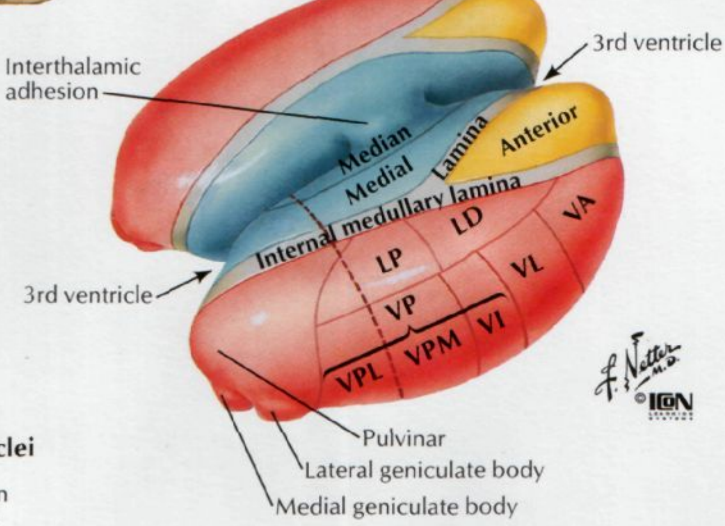


Schematic section through thalamus

(at level of broken line shown in figure at right)

Thalamic nuclei

CM	Centromedian
LD	Lateral dorsal
LP	Lateral posterior
M	Medial
MD	Medial dorsal
VA	Ventral anterior
VI	Ventral intermedial
VL	Ventral lateral
VP	Ventral posterior
VPL	Ventral posterolateral
VPM	Ventral posteromedial



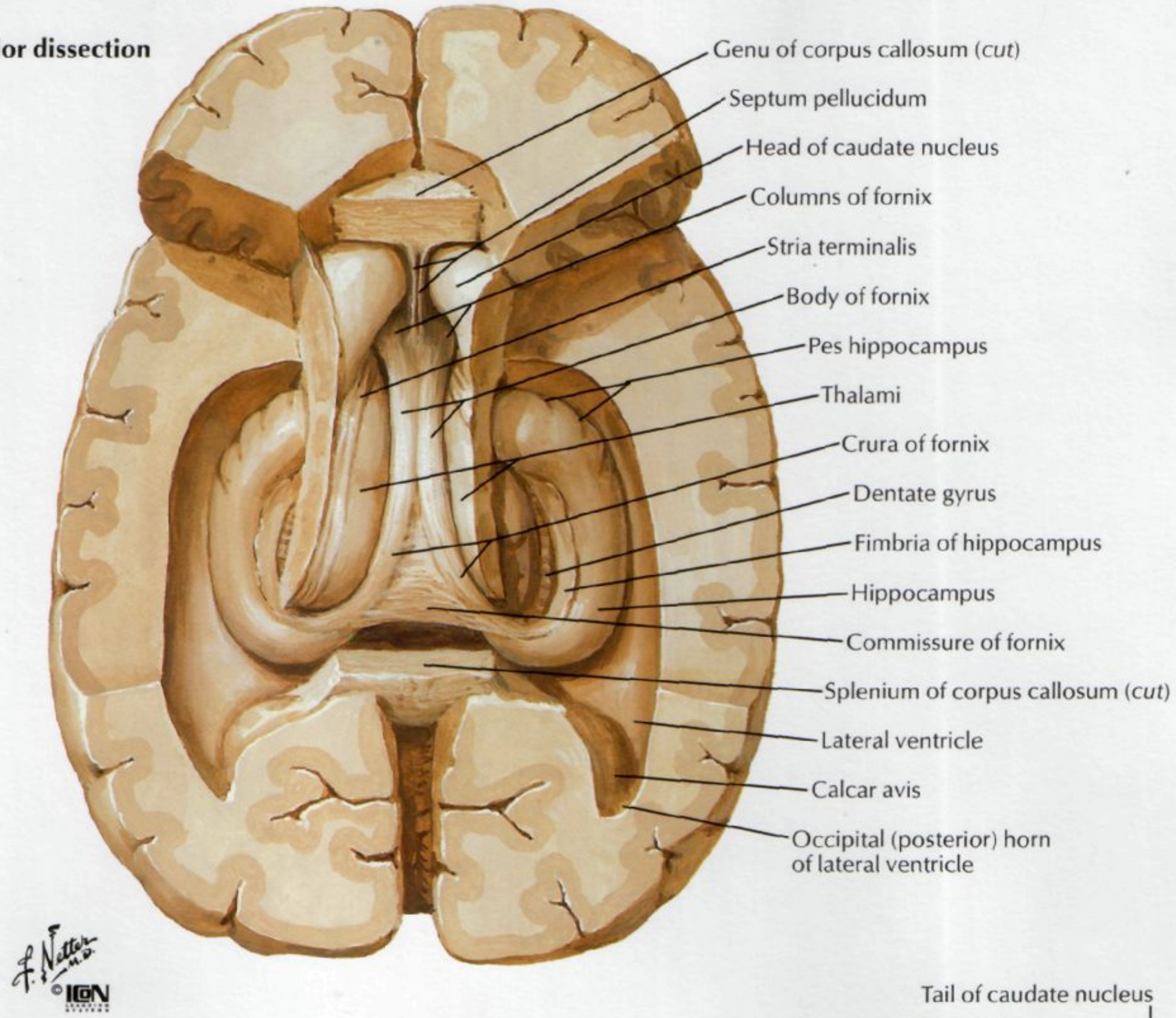
Schematic representation of thalamus

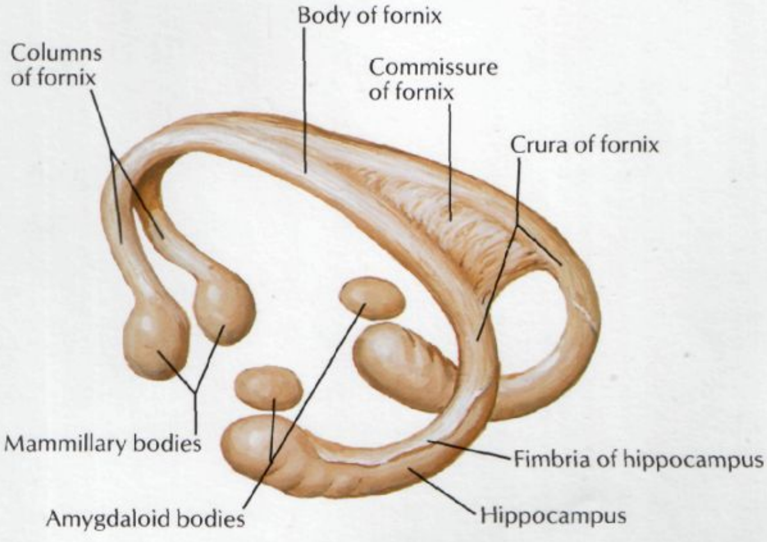
(external medullary lamina and reticular nuclei removed)

- 🟥 **Lateral nuclei**
- 🟦 **Medial nuclei**
- 🟨 **Anterior nuclei**

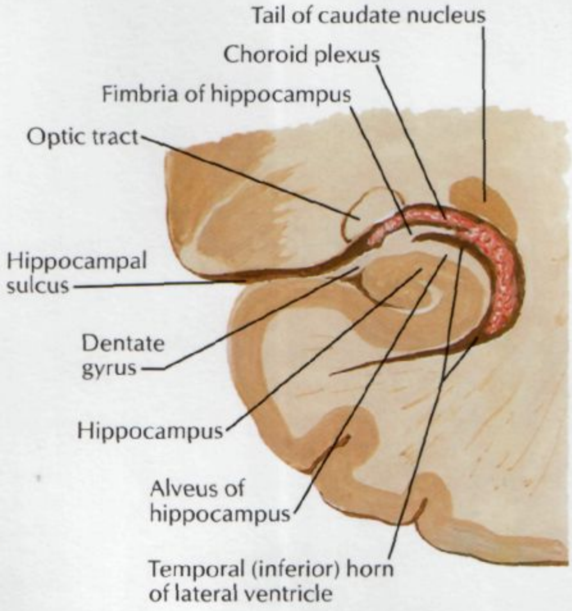
Hippocampus and Fornix

Superior dissection

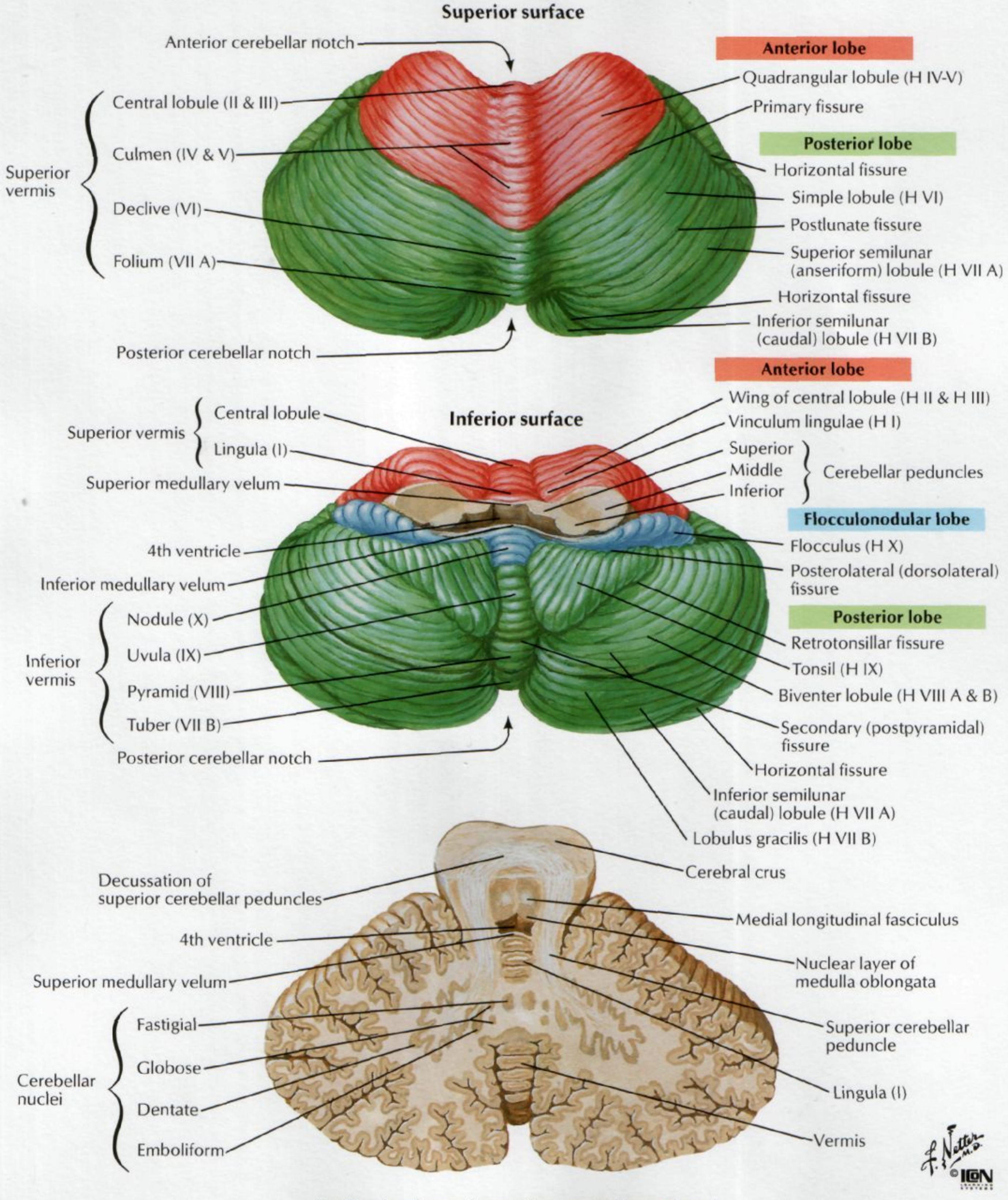




Fornix: schema



Coronal section: posterior view



Superior surface

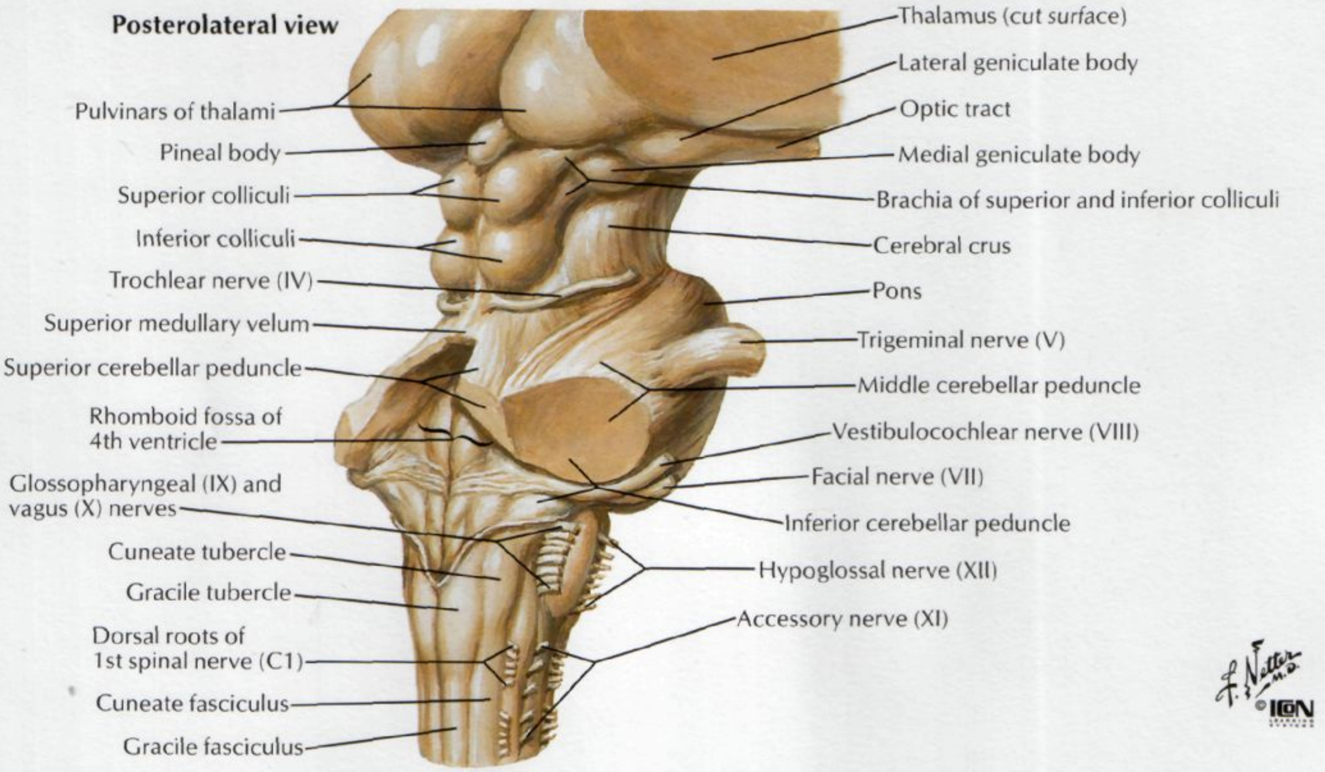
Anterior cerebellar notch
Superior vermis
Central lobule (II & III)
Culmen (IV & V)
Declive (VI)
Folium (VII A)
Posterior cerebellar notch
Anterior lobe
Quadrangular lobule (H IV-V)
Primary fissure
Posterior lobe
Horizontal fissure
Simple lobule (H VI)
Postlunate fissure
Superior semilunar (anseriform) lobule (H VII A)
Horizontal fissure
Inferior semilunar (caudal) lobule (H VII B)

Inferior surface

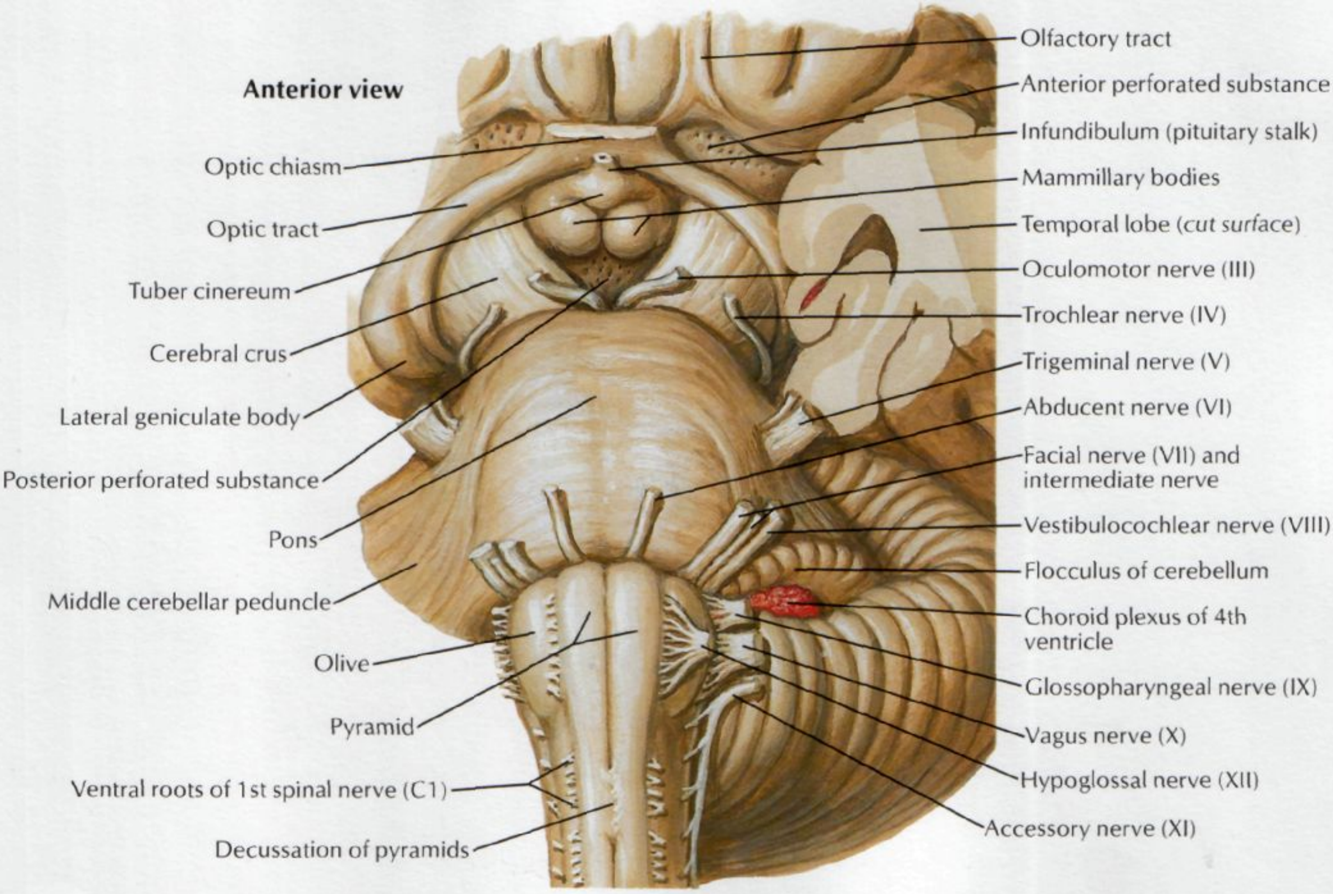
Section in plane of superior cerebellar peduncle

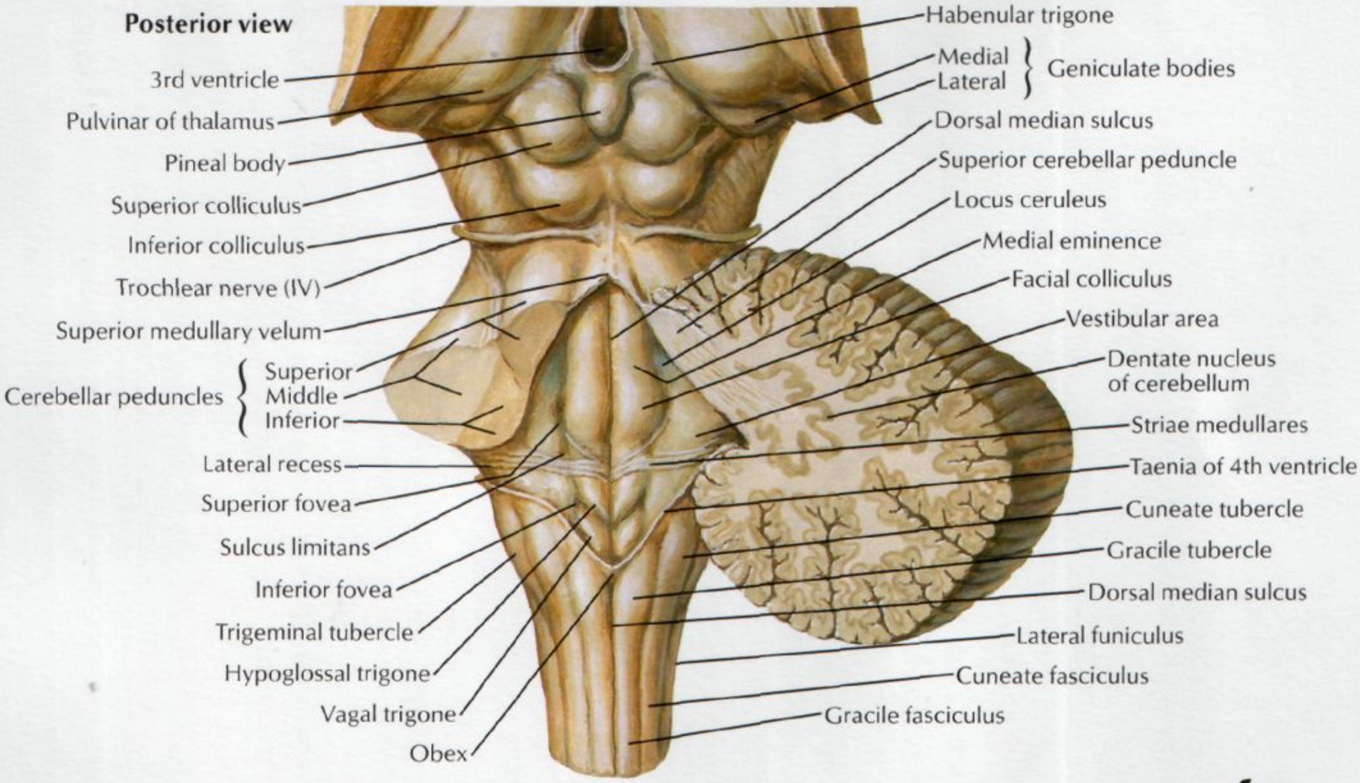
Brainstem

Posterolateral view

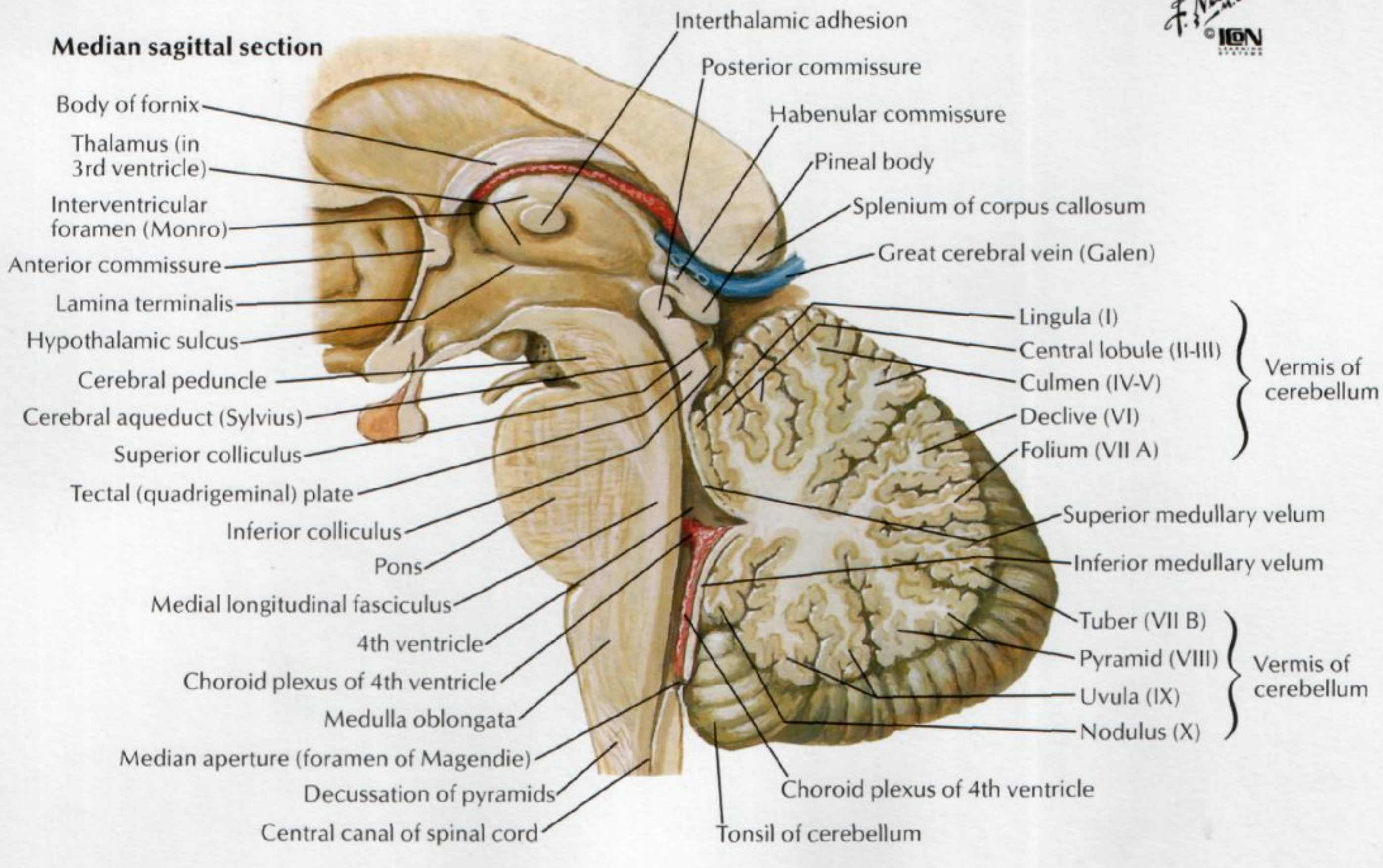


Anterior view


Olfactory tract
Anterior perforated substance
Infundibulum (pituitary stalk)
Optic chiasm
Mammillary bodies
Optic tract
Temporal lobe (cut surface)
Tuber cinereum
Oculomotor nerve (III)
Trochlear nerve (IV)
Cerebral crus
Trigeminal nerve (V)
Lateral geniculate body
Abducent nerve (VI)
Facial nerve (VII) and intermediate nerve
Posterior perforated substance
Pons
Vestibulocochlear nerve (VIII)
Flocculus of cerebellum
Middle cerebellar peduncle
Choroid plexus of 4th ventricle
Olive
Glossopharyngeal nerve (IX)
Pyramid
Vagus nerve (X)
Hypoglossal nerve (XII)
Ventral roots of 1st spinal nerve (C1)
Accessory nerve (XI)
Decussation of pyramids

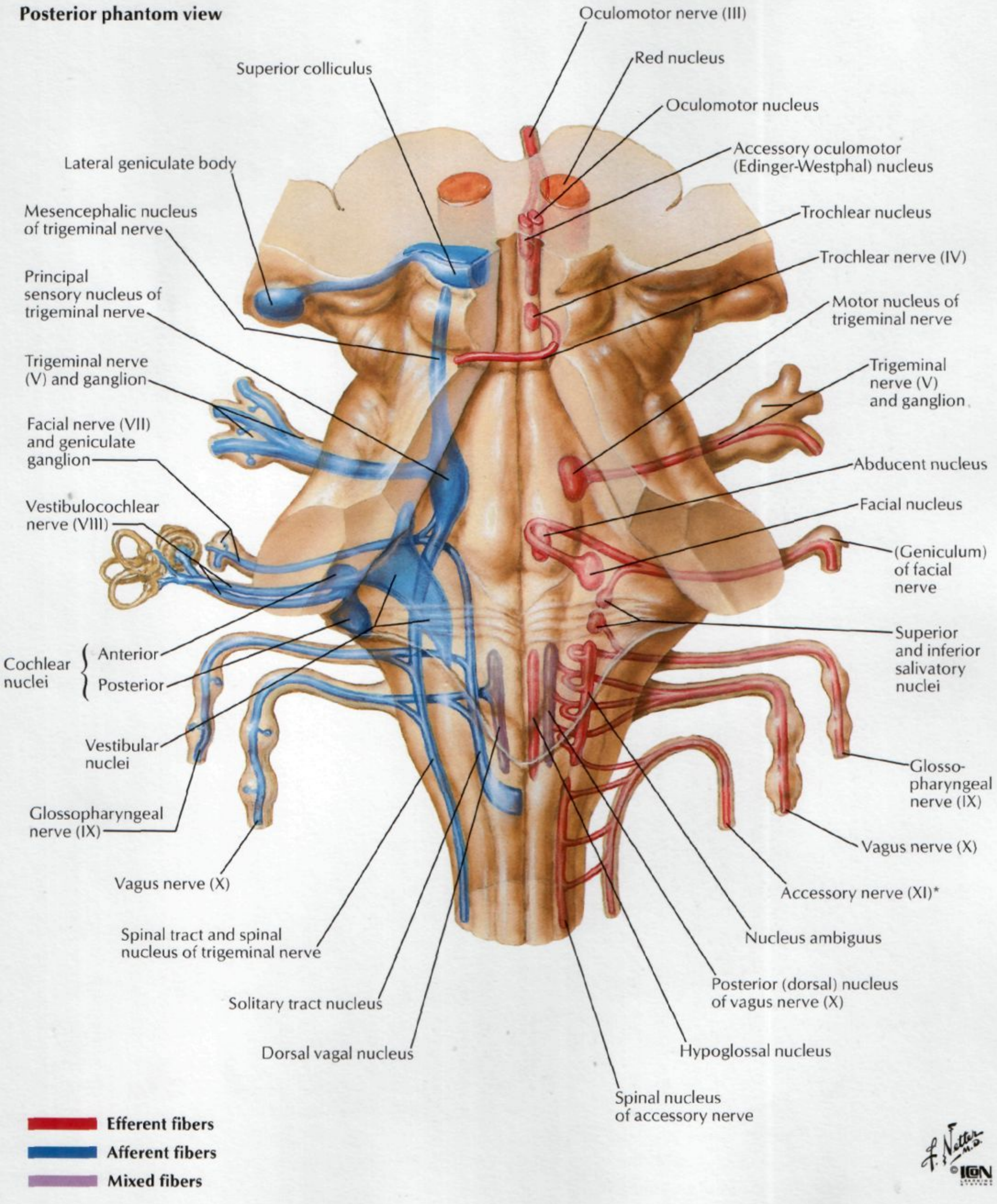


Posterior view



Median sagittal section

Cranial Nerve Nuclei in Brainstem: Schema



Posterior phantom view

Oculomotor nerve (III)
Red nucleus
Superior colliculus
Oculomotor nucleus
Accessory oculomotor (Edinger-Westphal) nucleus
Lateral geniculate body
Mesencephalic nucleus of trigeminal nerve
Trochlear nucleus
Trochlear nerve (IV)
Principal sensory nucleus of trigeminal nerve
Motor nucleus of trigeminal nerve
Trigeminal nerve (V) and ganglion
Trigeminal nerve (V) and ganglion
Facial nerve (VII) and geniculate ganglion
Abducent nucleus
Vestibulocochlear nerve (VIII)
Facial nucleus
(Geniculum) of facial nerve
Superior and inferior salivatory nuclei
Cochlear nuclei
Anterior
Posterior
Vestibular nuclei
Glossopharyngeal nerve (IX)
Glossopharyngeal nerve (IX)
Vagus nerve (X)
Vagus nerve (X)
Accessory nerve (XI)*
Spinal tract and spinal nucleus of trigeminal nerve
Nucleus ambiguus
Posterior (dorsal) nucleus of vagus nerve (X)
Solitary tract nucleus
Dorsal vagal nucleus
Hypoglossal nucleus
Spinal nucleus of accessory nerve
🟥 Efferent fibers
🟦 Afferent fibers
🟪 Mixed fibers
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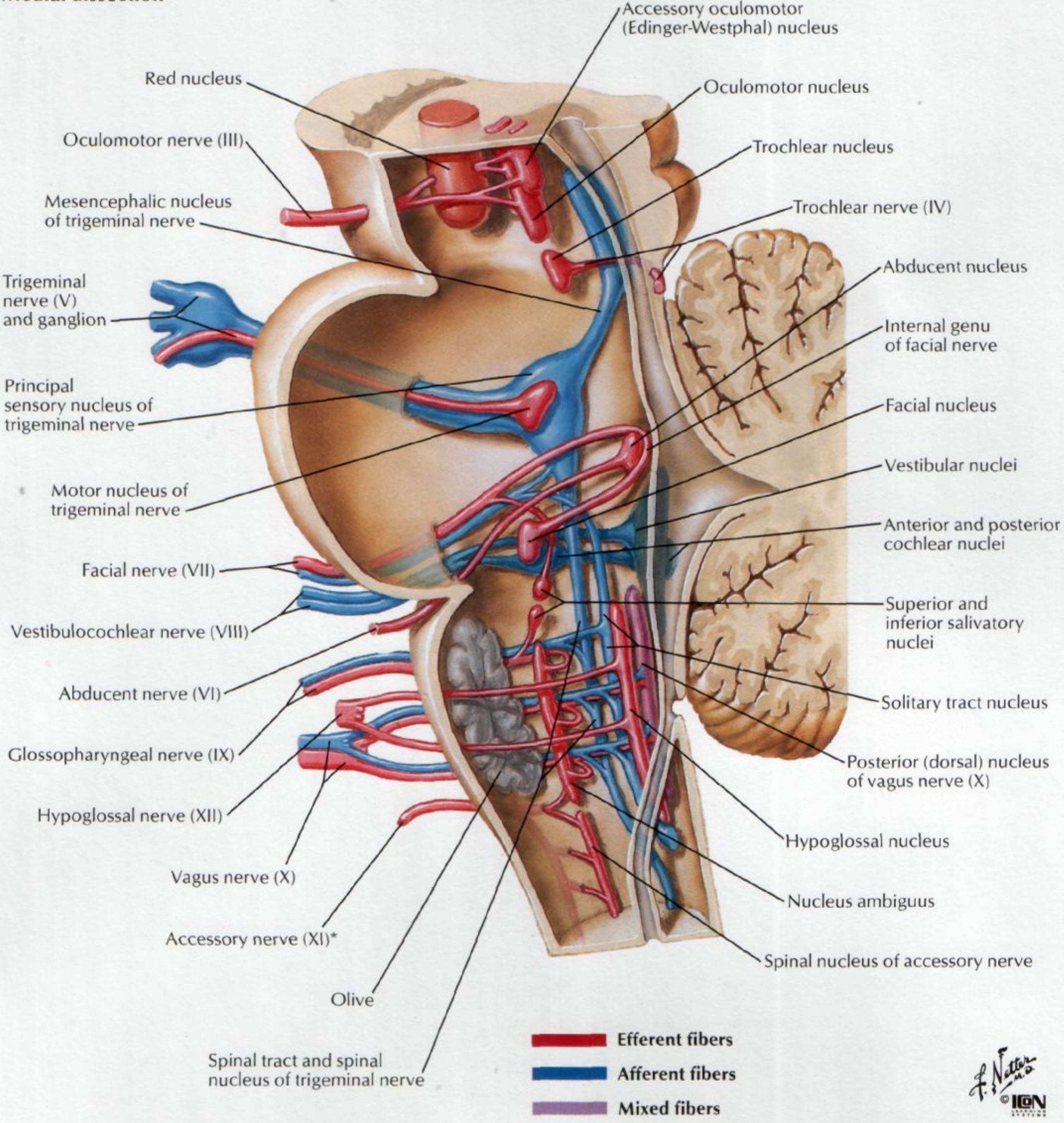
*Recent evidence suggests that the accessory nerve lacks a cranial root and has no connection to the vagus nerve. Verification of this finding awaits further investigation

Cranial Nerve Nuclei in Brainstem: Schema (continued)

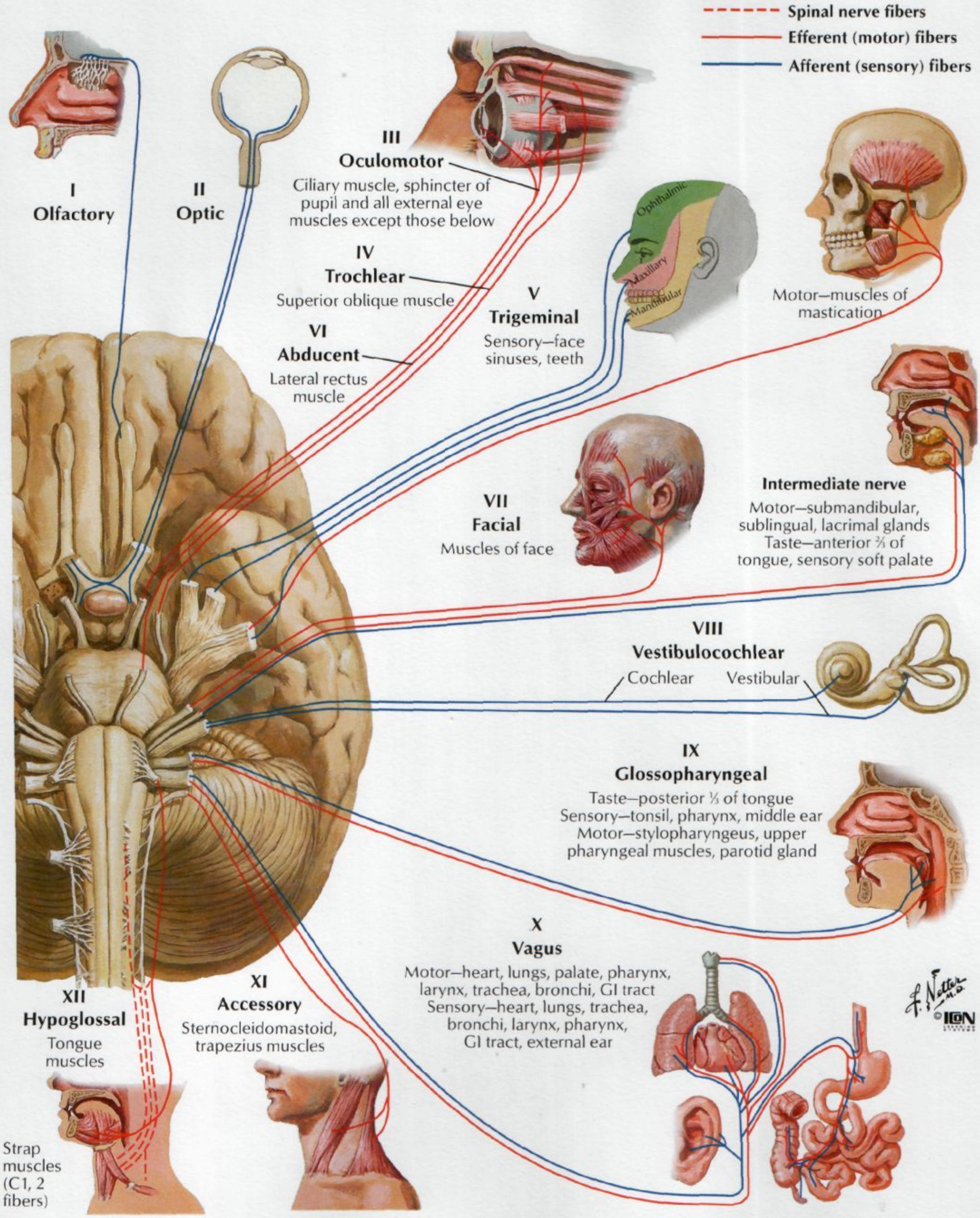
Medial dissection


Accessory oculomotor (Edinger-Westphal) nucleus
Red nucleus
Oculomotor nucleus
Oculomotor nerve (III)
Trochlear nucleus
Mesencephalic nucleus of trigeminal nerve
Trochlear nerve (IV)
Abducent nucleus
Trigeminal nerve (V) and ganglion
Internal genu of facial nerve
Principal sensory nucleus of trigeminal nerve
Facial nucleus
Vestibular nuclei
Motor nucleus of trigeminal nerve
Anterior and posterior cochlear nuclei
Facial nerve (VII)
Superior and inferior salivatory nuclei
Vestibulocochlear nerve (VIII)
Abducent nerve (VI)
Solitary tract nucleus
Glossopharyngeal nerve (IX)
Posterior (dorsal) nucleus of vagus nerve (X)
Hypoglossal nerve (XII)
Hypoglossal nucleus
Vagus nerve (X)
Nucleus ambiguus
Accessory nerve (XI)*
Spinal nucleus of accessory nerve
Olive
Spinal tract and spinal nucleus of trigeminal nerve
🟥 Efferent fibers
🟦 Afferent fibers
🟪 Mixed fibers

---

*Recent evidence suggests that the accessory nerve lacks a cranial root and has no connection to the vagus nerve. Verification of this finding awaits further investigation

Cranial Nerves (Motor and Sensory Distribution): Schema


Spinal nerve fibers
Efferent (motor) fibers
Afferent (sensory) fibers
I
Olfactory
II
Optic
III
Oculomotor
Ciliary muscle, sphincter of pupil and all external eye muscles except those below
IV
Trochlear
Superior oblique muscle
VI
Abducent
Lateral rectus muscle
V
Trigeminal
Sensory–face sinuses, teeth
Ophthalmic
Maxillary
Mandibular
Motor–muscles of mastication
Intermediate nerve
Motor–submandibular, sublingual, lacrimal glands
Taste–anterior ⅔ of tongue, sensory soft palate
VII
Facial
Muscles of face
VIII
Vestibulocochlear
Cochlear
Vestibular
IX
Glossopharyngeal
Taste–posterior ⅓ of tongue
Sensory–tonsil, pharynx, middle ear
Motor–stylopharyngeus, upper pharyngeal muscles, parotid gland
X
Vagus
Motor–heart, lungs, palate, pharynx, larynx, trachea, bronchi, GI tract
Sensory–heart, lungs, trachea, bronchi, larynx, pharynx, GI tract, external ear
XI
Accessory
Sternocleidomastoid, trapezius muscles
XII
Hypoglossal
Tongue muscles
Strap muscles (C1, 2 fibers)
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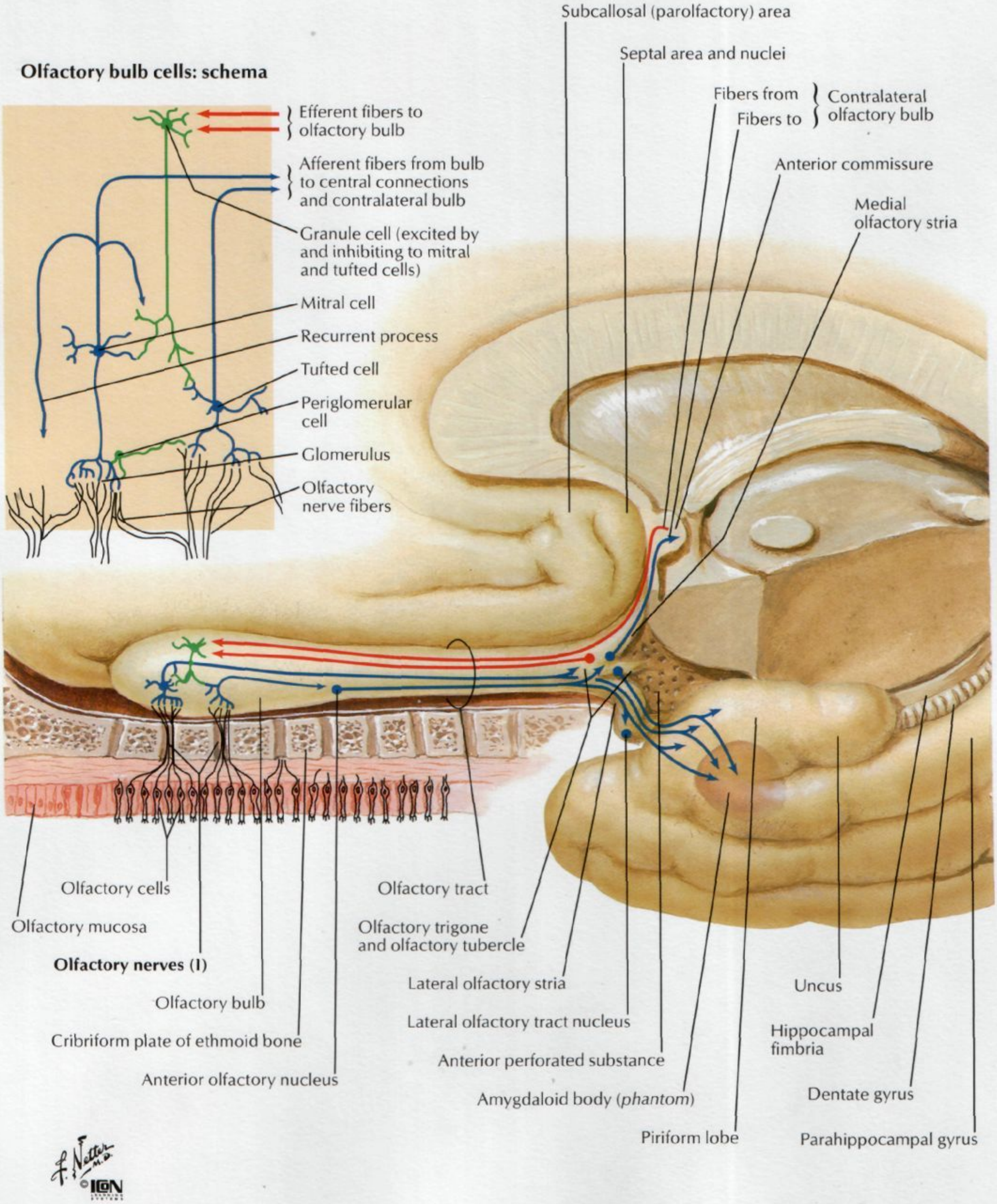
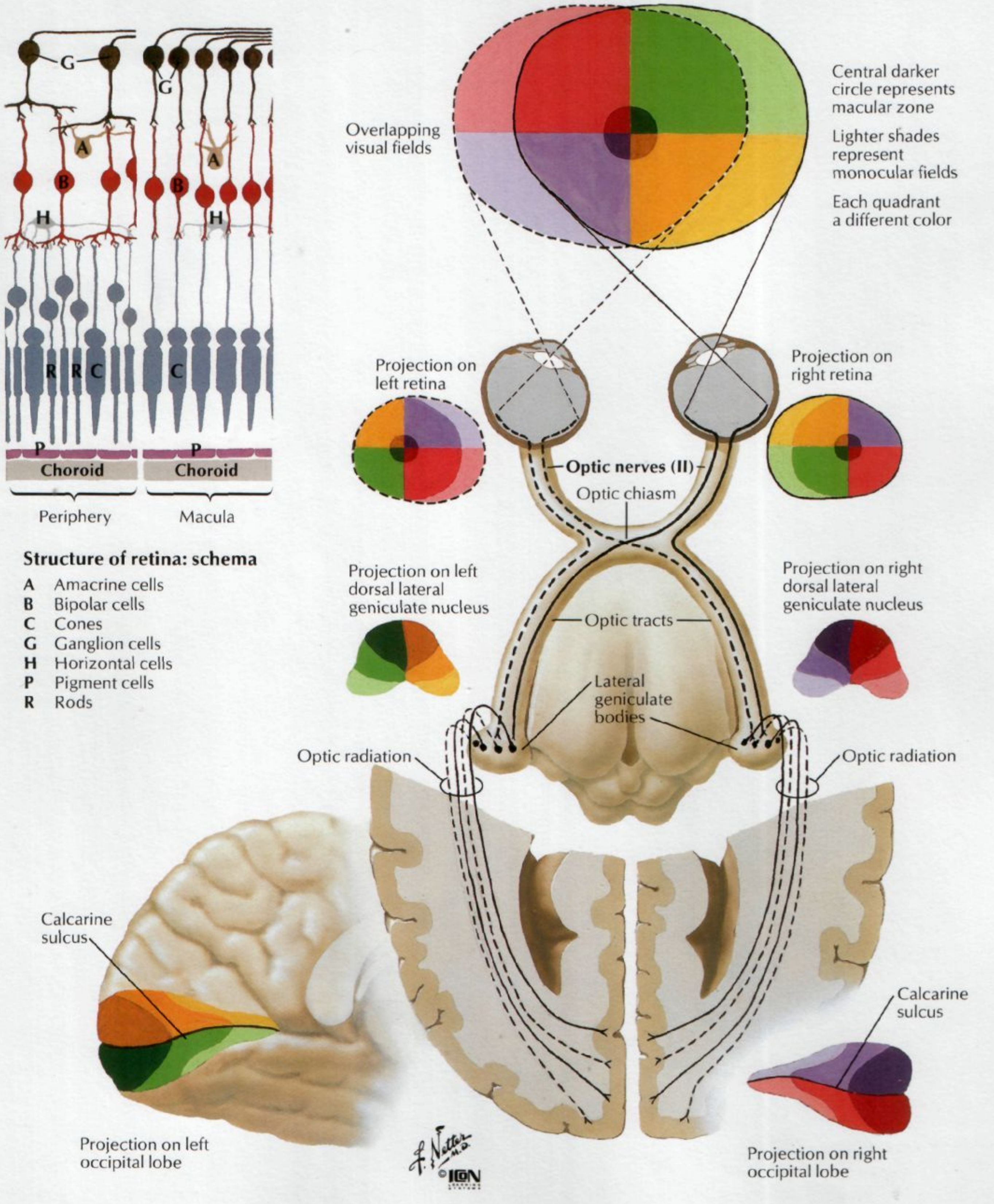
Olfactory Nerve (I): Schema


Olfactory bulb cells: schema
Efferent fibers to olfactory bulb
Afferent fibers from bulb to central connections and contralateral bulb
Granule cell (excited by and inhibiting to mitral and tufted cells)
Mitral cell
Recurrent process
Tufted cell
Periglomerular cell
Glomerulus
Olfactory nerve fibers
Subcallosal (parolfactory) area
Septal area and nuclei
Fibers from
Fibers to
Contralateral olfactory bulb
Anterior commissure
Medial olfactory stria
Olfactory cells
Olfactory mucosa
Olfactory nerves (I)
Olfactory bulb
Cribriform plate of ethmoid bone
Anterior olfactory nucleus
Olfactory tract
Olfactory trigone and olfactory tubercle
Lateral olfactory stria
Lateral olfactory tract nucleus
Anterior perforated substance
Amygdaloid body (phantom)
Piriform lobe
Uncus
Hippocampal fimbria
Dentate gyrus
Parahippocampal gyrus

Optic Nerve (II) (Visual Pathway): Schema


G
G
A
A
B
B
H
H
R
R
R
C
C
P
P
Choroid
Choroid
Periphery
Macula
Overlapping visual fields
Central darker circle represents macular zone
Lighter shades represent monocular fields
Each quadrant a different color
Projection on left retina
Projection on right retina
Optic nerves (II)
Optic chiasm
Projection on left dorsal lateral geniculate nucleus
Projection on right dorsal lateral geniculate nucleus
Optic tracts
Lateral geniculate bodies
Optic radiation
Optic radiation
Calcarine sulcus
Calcarine sulcus
Projection on left occipital lobe
Projection on right occipital lobe
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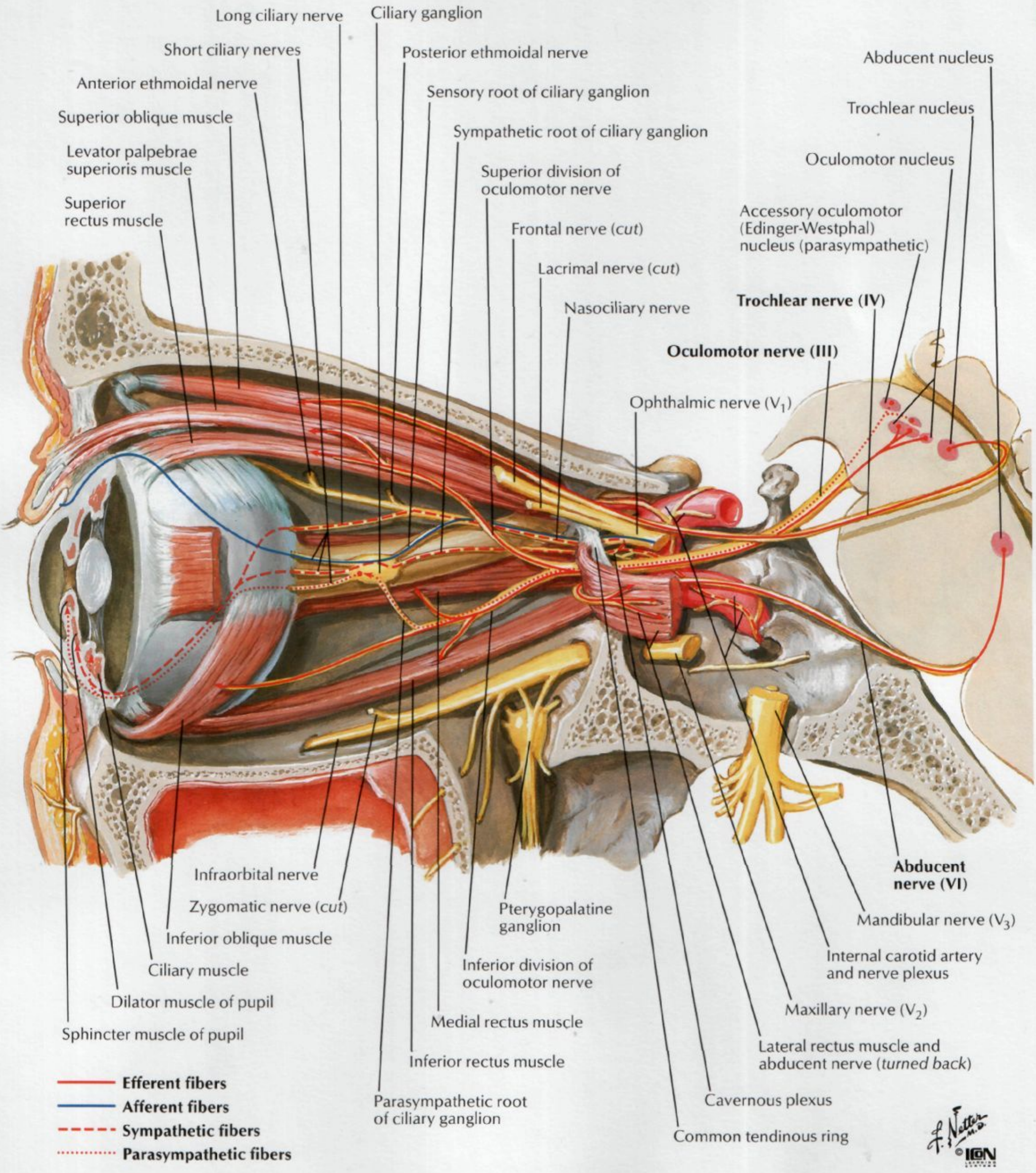
Structure of retina: schema

A	Amacrine cells
B	Bipolar cells
C	Cones
G	Ganglion cells
H	Horizontal cells
P	Pigment cells
R	Rods

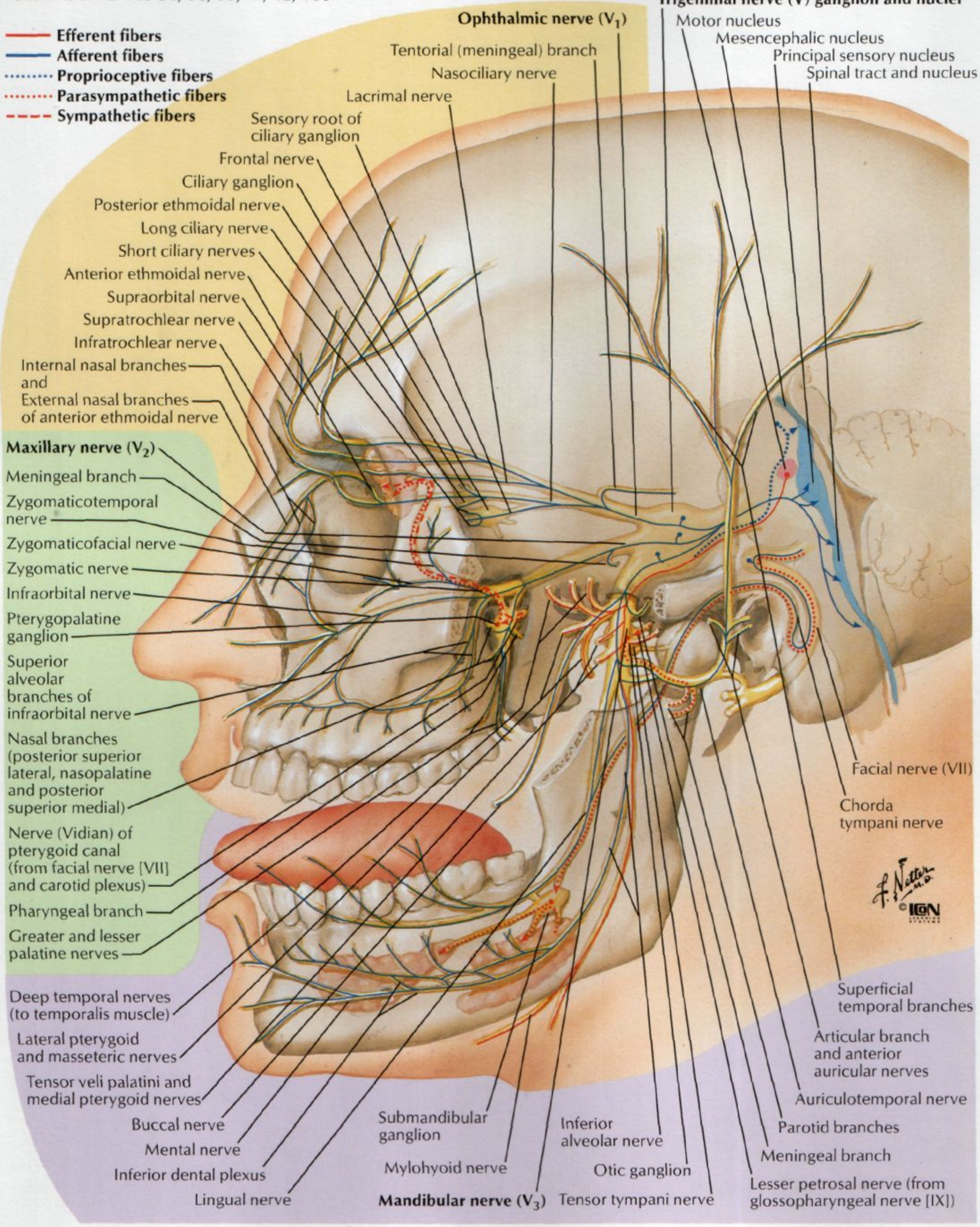
Oculomotor (III), Trochlear (IV) and Abducent (VI) Nerves: Schema

SEE ALSO PLATES 82, 126, 160



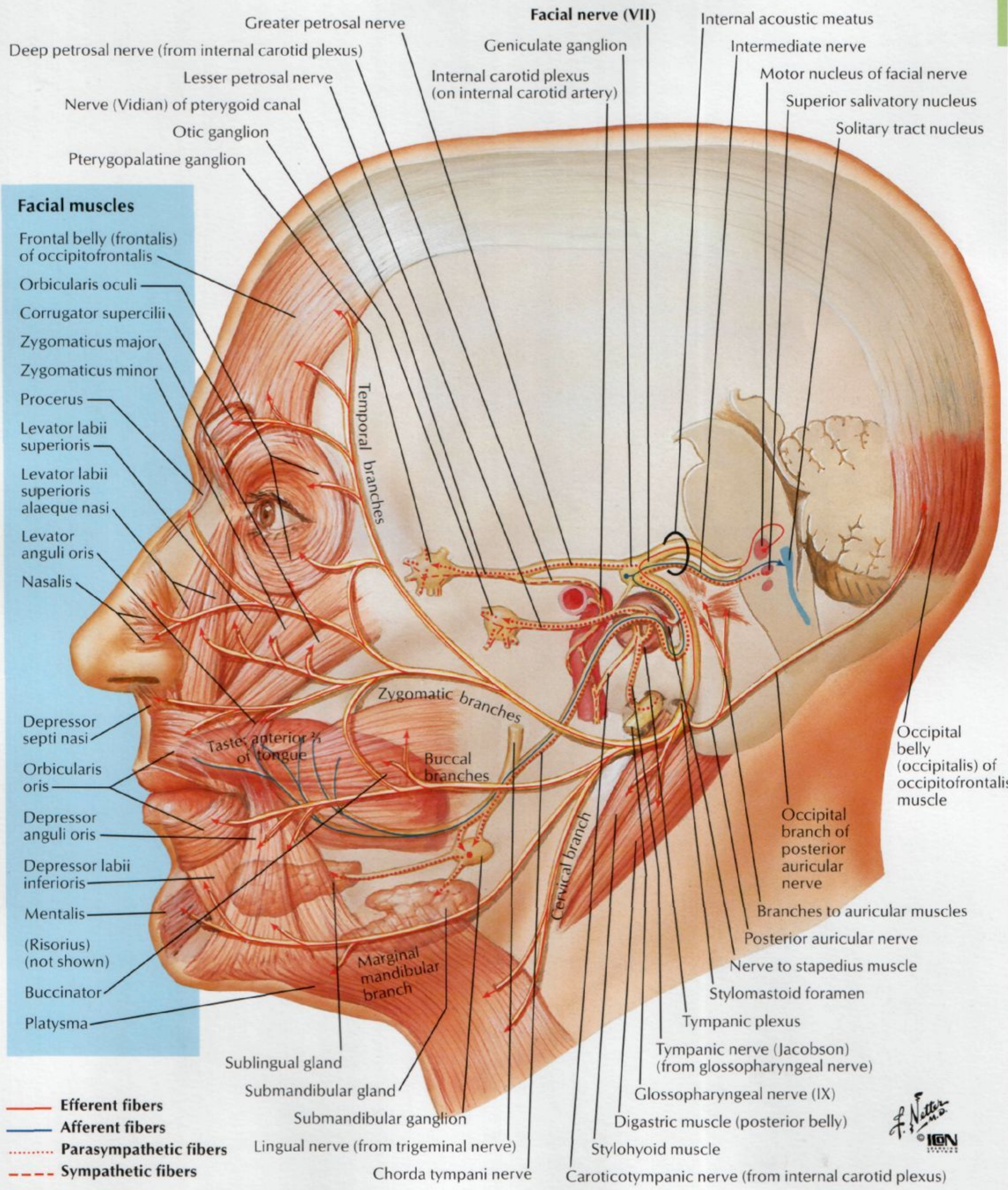
Trigeminal Nerve (V): Schema

SEE ALSO PLATES 20, 38, 39, 41, 42, 160



Facial Nerve (VII): Schema

SEE ALSO PLATES 21, 160


Greater petrosal nerve
Deep petrosal nerve (from internal carotid plexus)
Lesser petrosal nerve
Nerve (Vidian) of pterygoid canal
Otic ganglion
Pterygopalatine ganglion
Facial nerve (VII)
Geniculate ganglion
Internal carotid plexus (on internal carotid artery)
Internal acoustic meatus
Intermediate nerve
Motor nucleus of facial nerve
Superior salivatory nucleus
Solitary tract nucleus
Facial muscles
Frontal belly (frontalis) of occipitofrontalis
Orbicularis oculi
Corrugator supercilii
Zygomaticus major
Zygomaticus minor
Procerus
Levator labii superioris
Levator labii superioris alaeque nasi
Levator anguli oris
Nasalis
Depressor septi nasi
Orbicularis oris
Depressor anguli oris
Depressor labii inferioris
Mentalis
(Risorius) (not shown)
Buccinator
Platysma
Temporal branches
Zygomatic branches
Taste: anterior ⅔ of tongue
Buccal branches
Marginal mandibular branch
Cervical branch
Occipital belly (occipitalis) of occipitofrontali
muscle
Occipital branch of posterior auricular nerve
Branches to auricular muscles
Posterior auricular nerve
Nerve to stapedius muscle
Stylomastoid foramen
Tympanic plexus
Tympanic nerve (Jacobson) (from glossopharyngeal nerve)
Glossopharyngeal nerve (IX)
Digastric muscle (posterior belly)
Stylohyoid muscle
Caroticotympanic nerve (from internal carotid plexus)
Sublingual gland
Submandibular gland
Submandibular ganglion
Lingual nerve (from trigeminal nerve)
Chorda tympani nerve
Efferent fibers
Afferent fibers
Parasympathetic fibers
Sympathetic fibers
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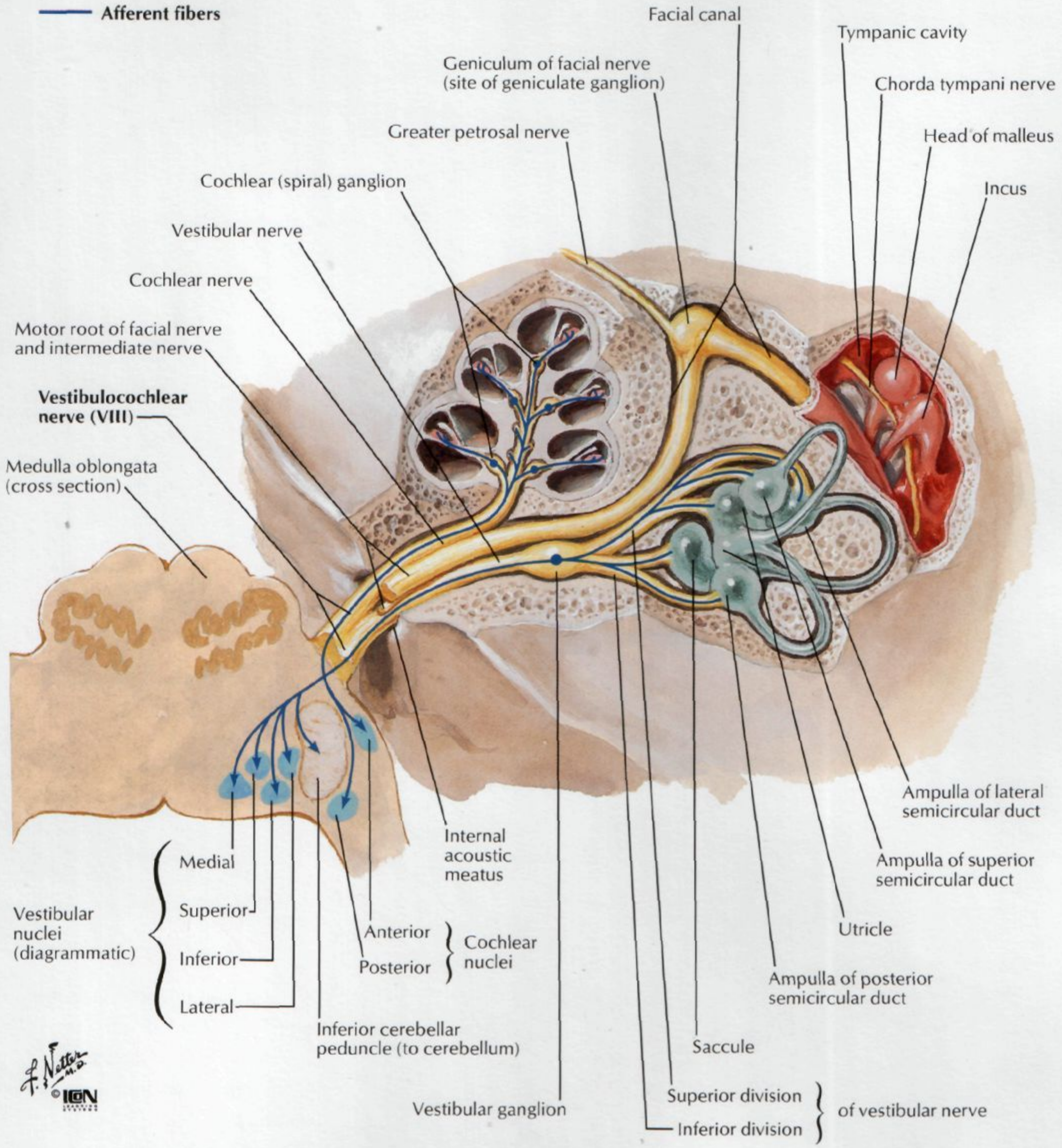
Vestibulocochlear Nerve (VIII): Schema


Afferent fibers
Facial canal
Tympanic cavity
Geniculum of facial nerve (site of geniculate ganglion)
Chorda tympani nerve
Greater petrosal nerve
Head of malleus
Cochlear (spiral) ganglion
Incus
Vestibular nerve
Cochlear nerve
Motor root of facial nerve and intermediate nerve
Vestibulocochlear nerve (VIII)
Medulla oblongata (cross section)
Ampulla of lateral semicircular duct
Internal acoustic meatus
Ampulla of superior semicircular duct
Vestibular nuclei (diagrammatic)
Medial
Superior
Inferior
Lateral
Anterior
Posterior
Cochlear nuclei
Utricle
Ampulla of posterior semicircular duct
Inferior cerebellar peduncle (to cerebellum)
Saccule
Vestibular ganglion
Superior division
Inferior division
of vestibular nerve
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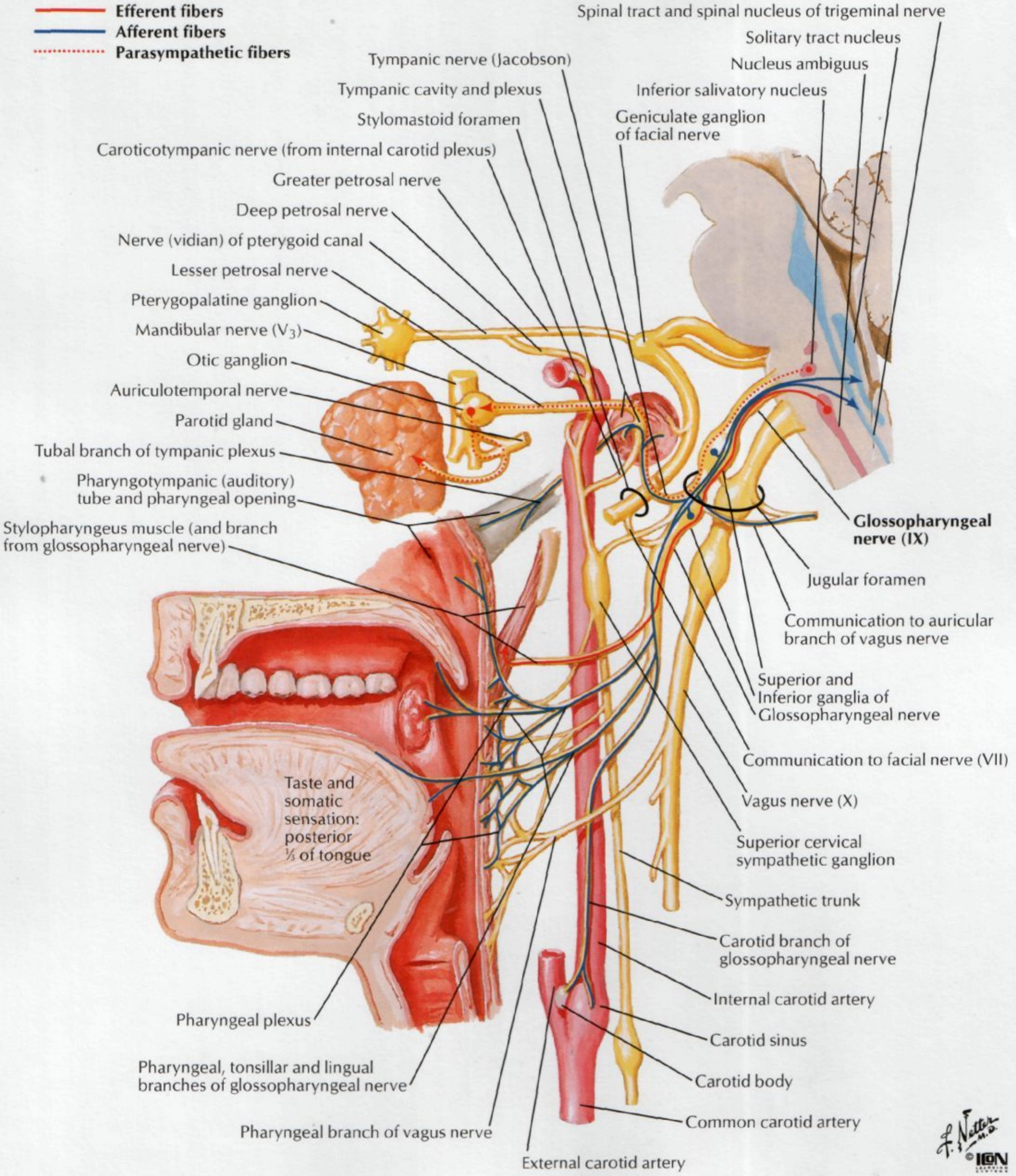
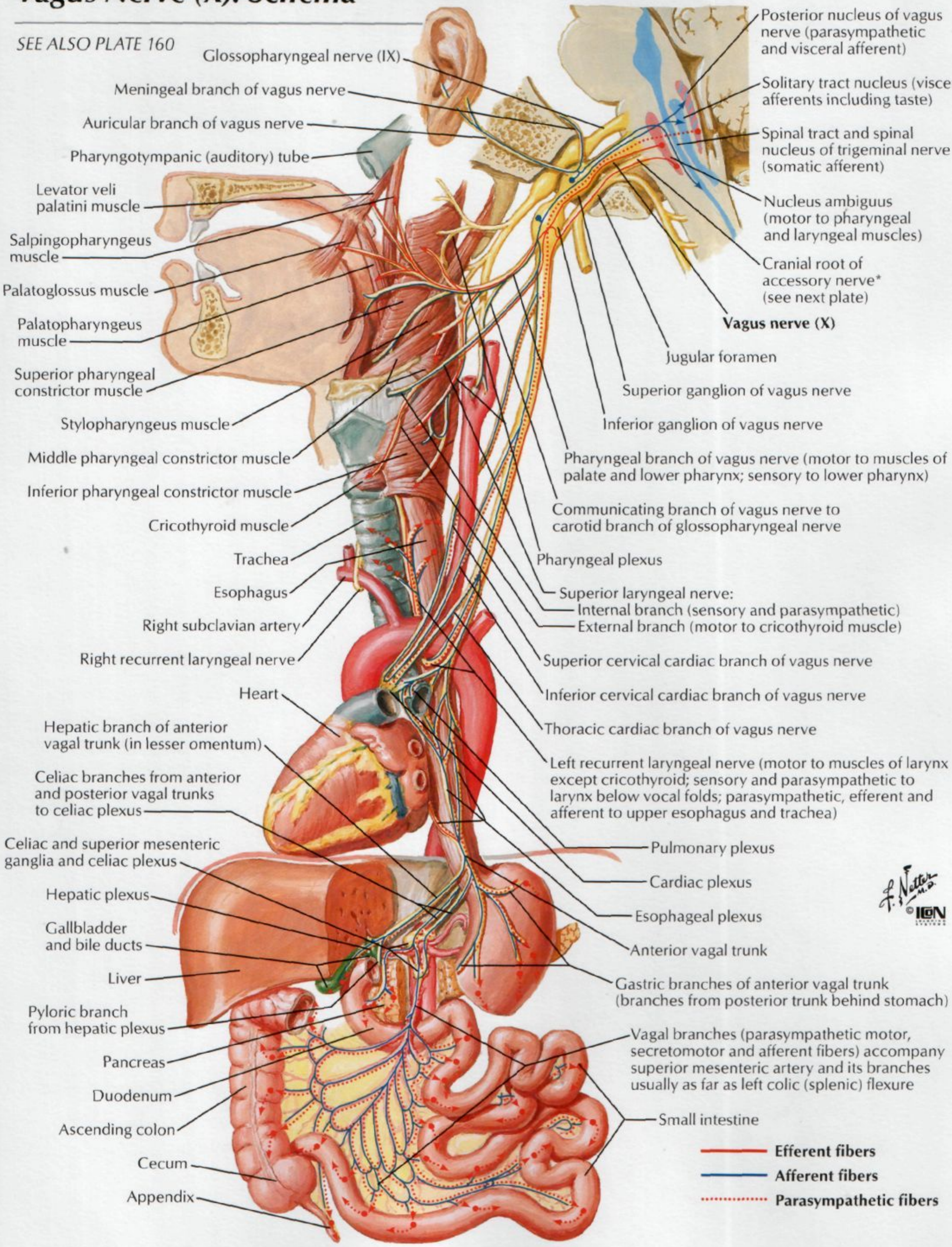
Glossopharyngeal Nerve (IX): Schema

SEE ALSO PLATE 160


Efferent fibers
Afferent fibers
Parasympathetic fibers
Spinal tract and spinal nucleus of trigeminal nerve
Solitary tract nucleus
Nucleus ambiguus
Inferior salivatory nucleus
Tympanic nerve (Jacobson)
Tympanic cavity and plexus
Stylomastoid foramen
Geniculate ganglion of facial nerve
Caroticotympanic nerve (from internal carotid plexus)
Greater petrosal nerve
Deep petrosal nerve
Nerve (vidian) of pterygoid canal
Lesser petrosal nerve
Pterygopalatine ganglion
Mandibular nerve (V_3)
Otic ganglion
Auriculotemporal nerve
Parotid gland
Tubal branch of tympanic plexus
Pharyngotympanic (auditory) tube and pharyngeal opening
Stylopharyngeus muscle (and branch from glossopharyngeal nerve)
Glossopharyngeal nerve (IX)
Jugular foramen
Communication to auricular branch of vagus nerve
Superior and Inferior ganglia of Glossopharyngeal nerve
Communication to facial nerve (VII)
Vagus nerve (X)
Taste and somatic sensation: posterior ⅓ of tongue
Superior cervical sympathetic ganglion
Sympathetic trunk
Carotid branch of glossopharyngeal nerve
Internal carotid artery
Pharyngeal plexus
Carotid sinus
Pharyngeal, tonsillar and lingual branches of glossopharyngeal nerve
Carotid body
Common carotid artery
Pharyngeal branch of vagus nerve
External carotid artery

Vagus Nerve (X): Schema

SEE ALSO PLATE 160


Glossopharyngeal nerve (IX)
Meningeal branch of vagus nerve
Auricular branch of vagus nerve
Pharyngotympanic (auditory) tube
Levator veli palatini muscle
Salpingopharyngeus muscle
Palatoglossus muscle
Palatopharyngeus muscle
Superior pharyngeal constrictor muscle
Stylopharyngeus muscle
Middle pharyngeal constrictor muscle
Inferior pharyngeal constrictor muscle
Cricothyroid muscle
Trachea
Esophagus
Right subclavian artery
Right recurrent laryngeal nerve
Heart
Hepatic branch of anterior vagal trunk (in lesser omentum)
Celiac branches from anterior and posterior vagal trunks to celiac plexus
Celiac and superior mesenteric ganglia and celiac plexus
Hepatic plexus
Gallbladder and bile ducts
Liver
Pyloric branch from hepatic plexus
Pancreas
Duodenum
Ascending colon
Cecum
Appendix
Posterior nucleus of vagus nerve (parasympathetic and visceral afferent)
Solitary tract nucleus (visceral afferents including taste)
Spinal tract and spinal nucleus of trigeminal nerve (somatic afferent)
Nucleus ambiguus (motor to pharyngeal and laryngeal muscles)
Cranial root of accessory nerve* (see next plate)
Vagus nerve (X)
Jugular foramen
Superior ganglion of vagus nerve
Inferior ganglion of vagus nerve
Pharyngeal branch of vagus nerve (motor to muscles of palate and lower pharynx; sensory to lower pharynx)
Communicating branch of vagus nerve to carotid branch of glossopharyngeal nerve
Pharyngeal plexus
Superior laryngeal nerve:
Internal branch (sensory and parasympathetic)
External branch (motor to cricothyroid muscle)
Superior cervical cardiac branch of vagus nerve
Inferior cervical cardiac branch of vagus nerve
Thoracic cardiac branch of vagus nerve
Left recurrent laryngeal nerve (motor to muscles of larynx except cricothyroid; sensory and parasympathetic to larynx below vocal folds; parasympathetic, efferent and afferent to upper esophagus and trachea)
Pulmonary plexus
Cardiac plexus
Esophageal plexus
Anterior vagal trunk
Gastric branches of anterior vagal trunk (branches from posterior trunk behind stomach)
Vagal branches (parasympathetic motor, secretomotor and afferent fibers) accompany superior mesenteric artery and its branches usually as far as left colic (splenic) flexure
Small intestine
Efferent fibers
Afferent fibers
Parasympathetic fibers
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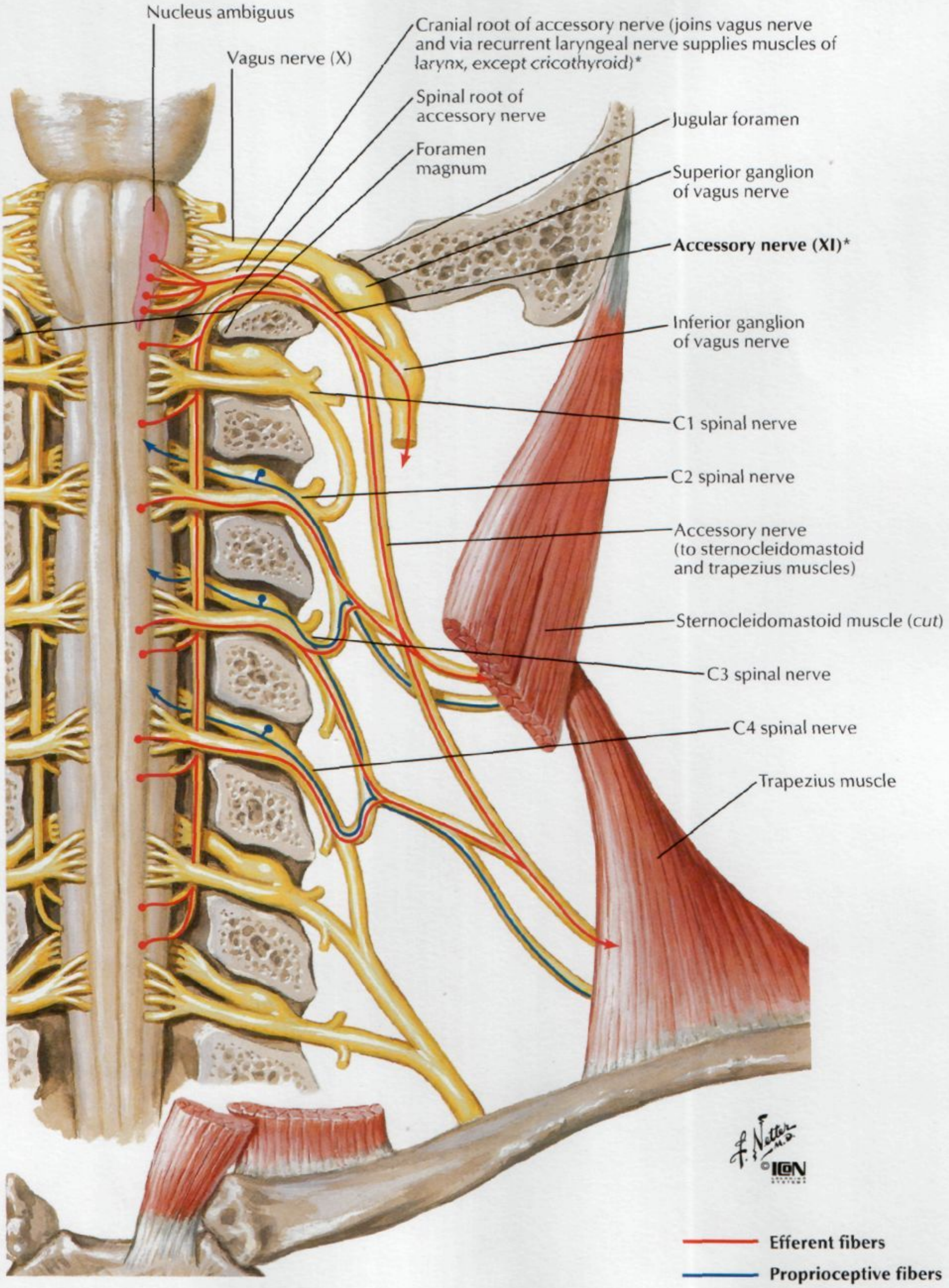
Accessory Nerve (XI): Schema

SEE ALSO PLATE 28


Nucleus ambiguus
Vagus nerve (X)
Cranial root of accessory nerve (joins vagus nerve and via recurrent laryngeal nerve supplies muscles of larynx, except cricothyroid)*
Spinal root of accessory nerve
Foramen magnum
Jugular foramen
Superior ganglion of vagus nerve
Accessory nerve (XI)*
Inferior ganglion of vagus nerve
C1 spinal nerve
C2 spinal nerve
Accessory nerve (to sternocleidomastoid and trapezius muscles)
Sternocleidomastoid muscle (*cut*)
C3 spinal nerve
C4 spinal nerve
Trapezius muscle
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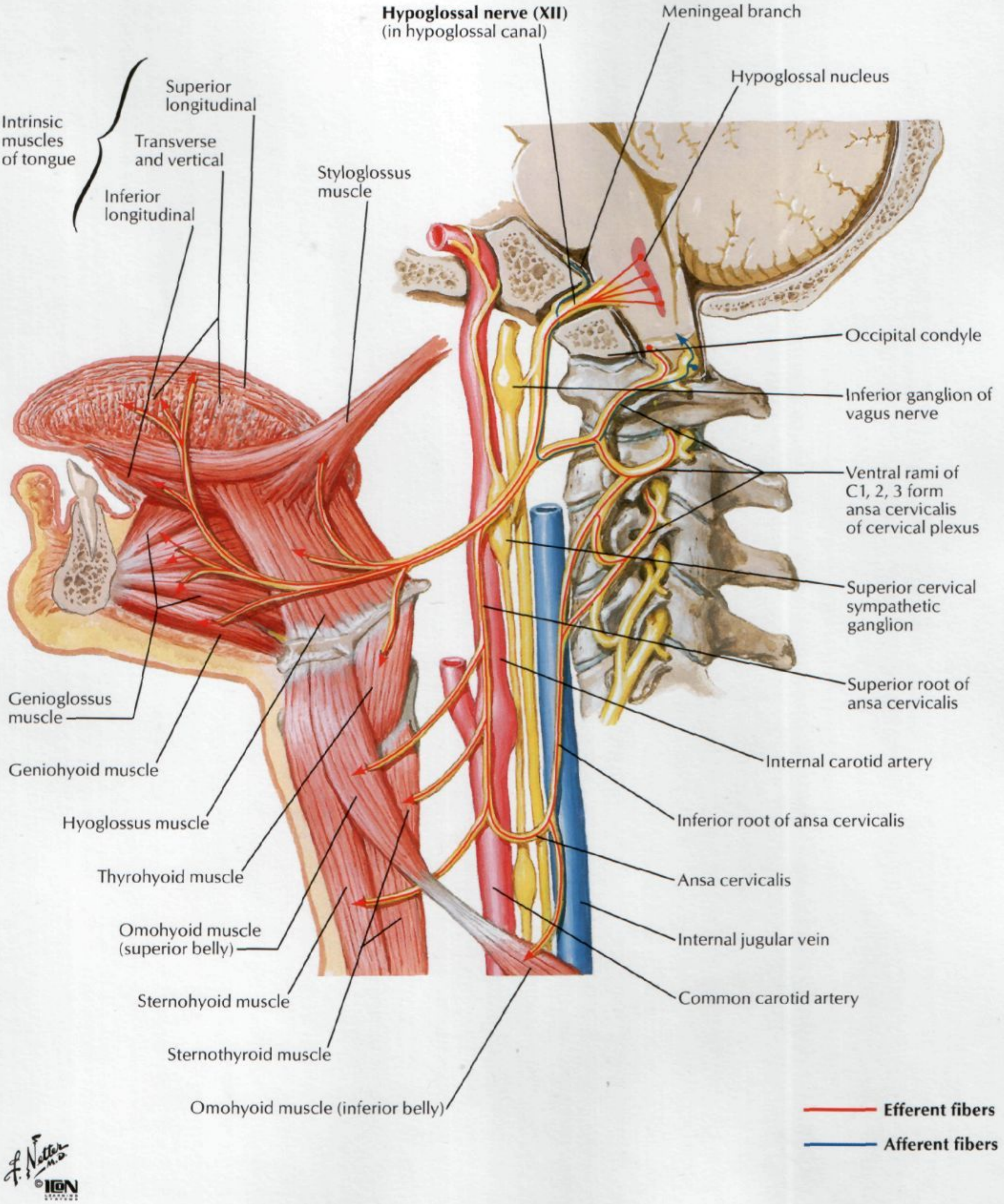
Efferent fibers
Proprioceptive fibers

*Recent evidence suggests that the accessory nerve lacks a cranial root and has no connection to the vagus nerve. Verification of this finding awaits further investigation.

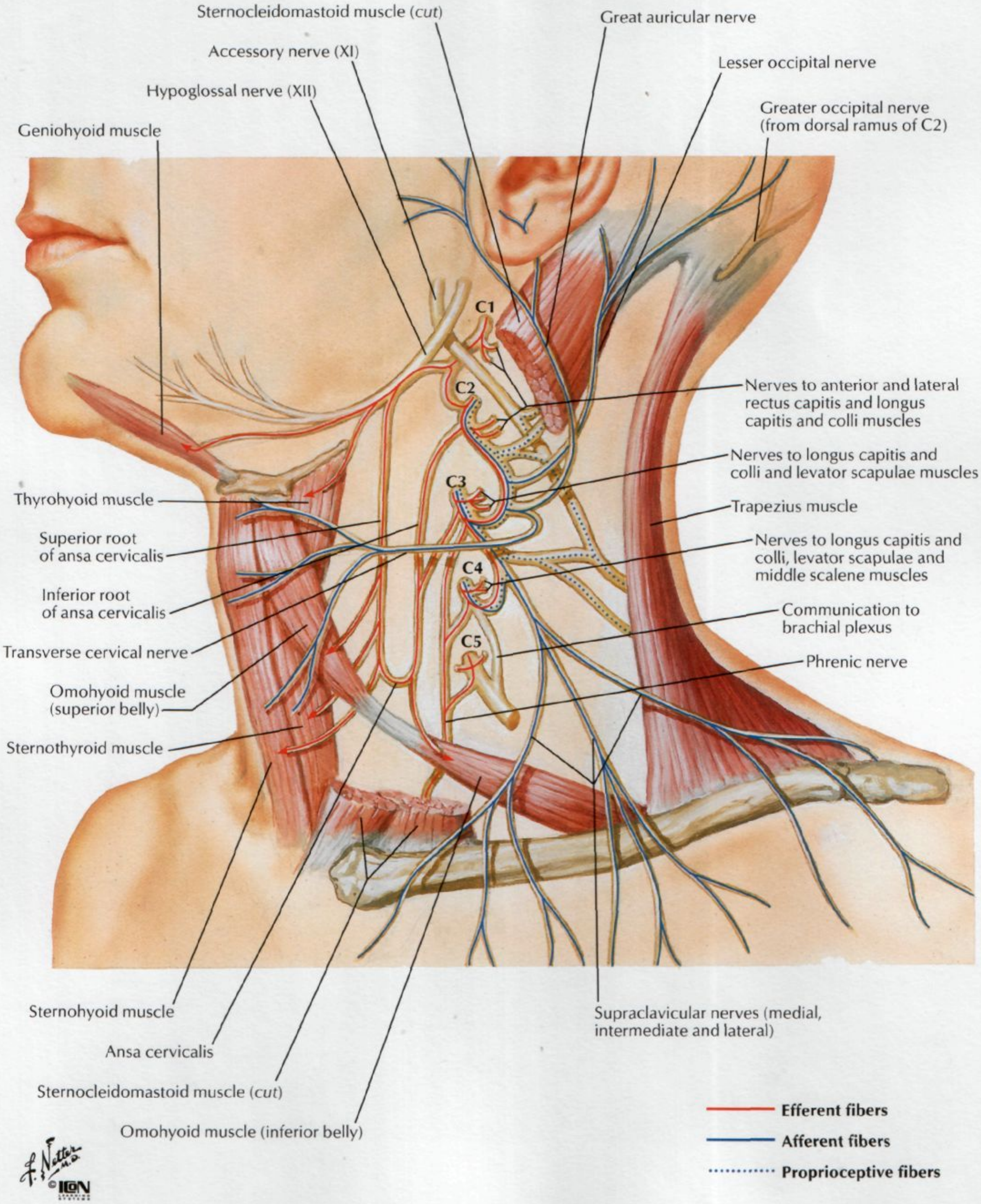
Hypoglossal Nerve (XII): Schema

SEE ALSO PLATE 28



Cervical Plexus: Schema

SEE ALSO PLATE 28


Sternocleidomastoid muscle (*cut*)
Great auricular nerve
Accessory nerve (XI)
Lesser occipital nerve
Hypoglossal nerve (XII)
Greater occipital nerve (from dorsal ramus of C2)
Geniohyoid muscle
C1
C2
C3
C4
C5
Nerves to anterior and lateral rectus capitis and longus capitis and colli muscles
Nerves to longus capitis and colli and levator scapulae muscles
Thyrohyoid muscle
Trapezius muscle
Superior root of ansa cervicalis
Nerves to longus capitis and colli, levator scapulae and middle scalene muscles
Inferior root of ansa cervicalis
Communication to brachial plexus
Transverse cervical nerve
Phrenic nerve
Omohyoid muscle (superior belly)
Sternothyroid muscle
Sternohyoid muscle
Supraclavicular nerves (medial, intermediate and lateral)
Ansa cervicalis
Sternocleidomastoid muscle (*cut*)
Omohyoid muscle (inferior belly)
Efferent fibers
Afferent fibers
Proprioceptive fibers

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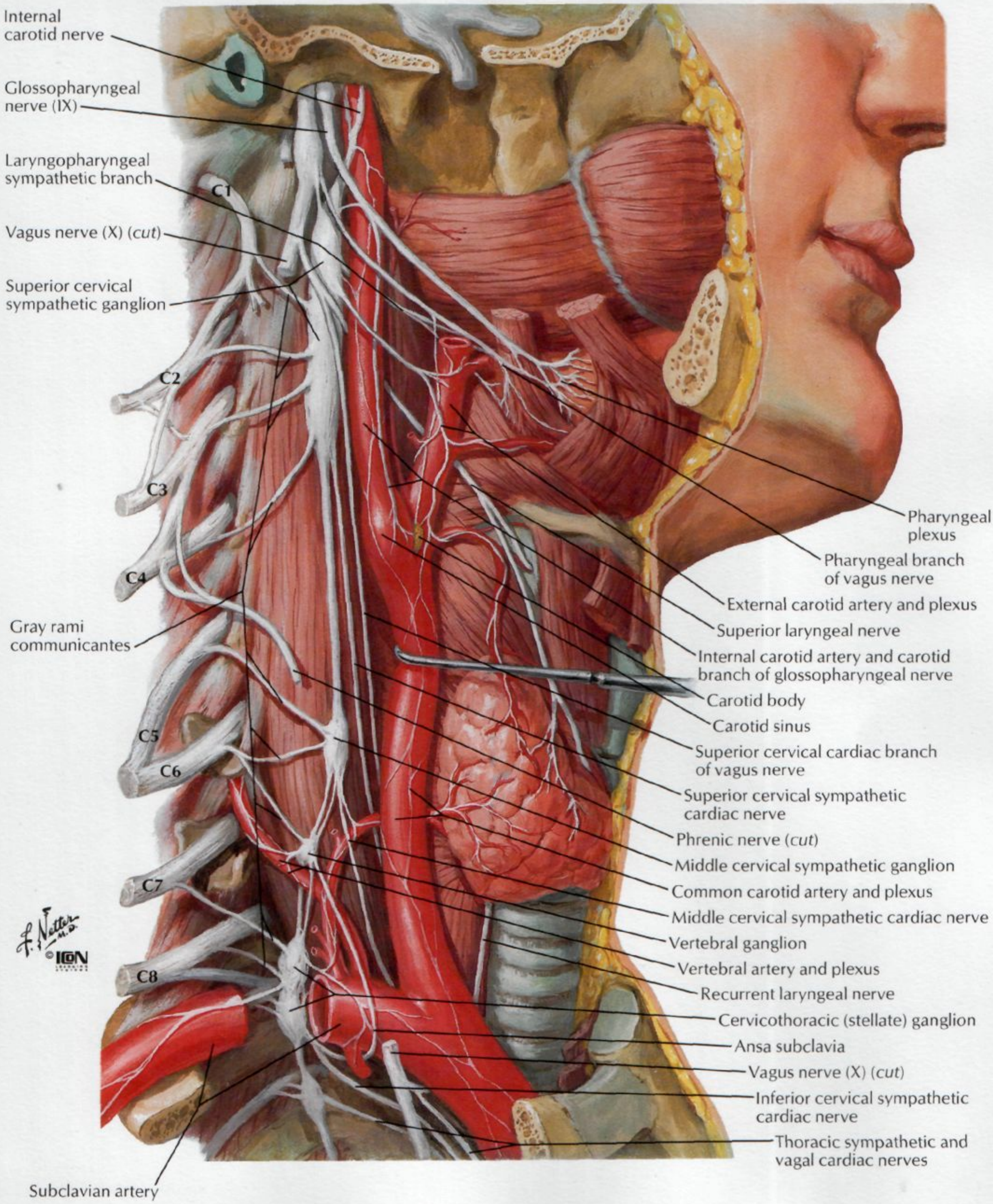
Autonomic Nerves in Neck

SEE ALSO PLATES 67, 119, 120, 159, 205, 222, 236, 308



Internal carotid nerve
Glossopharyngeal nerve (IX)
Laryngopharyngeal sympathetic branch
C1
Vagus nerve (X) (*cut*)
Superior cervical sympathetic ganglion
C2
C3
C4
Gray rami communicantes
C5
C6
C7
C8
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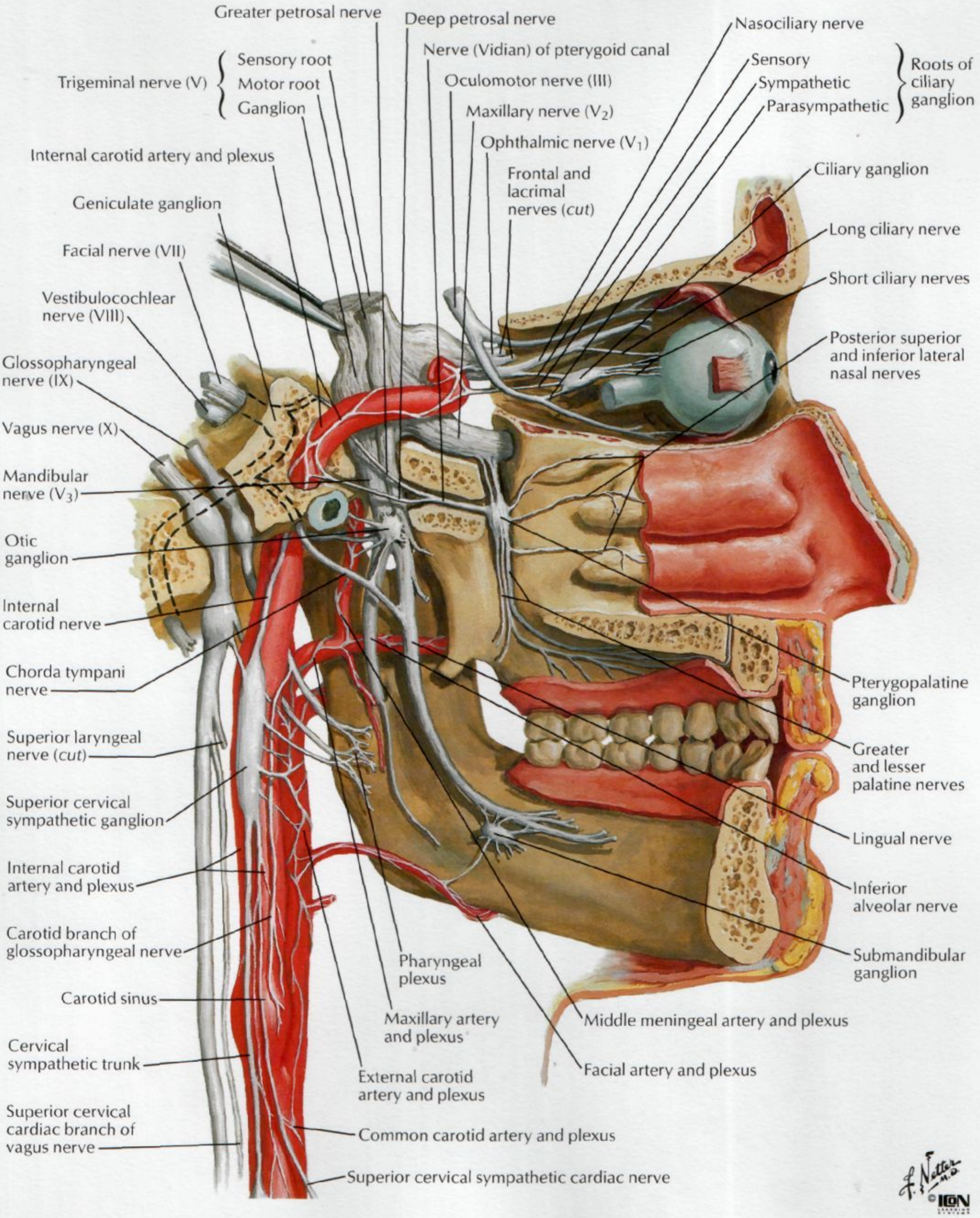
Subclavian artery
Pharyngeal plexus
Pharyngeal branch of vagus nerve
External carotid artery and plexus
Superior laryngeal nerve
Internal carotid artery and carotid branch of glossopharyngeal nerve
Carotid body
Carotid sinus
Superior cervical cardiac branch of vagus nerve
Superior cervical sympathetic cardiac nerve
Phrenic nerve (*cut*)
Middle cervical sympathetic ganglion
Common carotid artery and plexus
Middle cervical sympathetic cardiac nerve
Vertebral ganglion
Vertebral artery and plexus
Recurrent laryngeal nerve
Cervicothoracic (stellate) ganglion
Ansa subclavia
Vagus nerve (X) (*cut*)
Inferior cervical sympathetic cardiac nerve
Thoracic sympathetic and vagal cardiac nerves

Autonomic Nerves in Head

SEE ALSO PLATES 40–42, 82, 115, 126–128, 159


Greater petrosal nerve
Deep petrosal nerve
Nerve (Vidian) of pterygoid canal
Oculomotor nerve (III)
Maxillary nerve (V_2)
Ophthalmic nerve (V_1)
Frontal and lacrimal nerves (*cut*)
Nasociliary nerve
Sensory
Sympathetic
Parasympathetic
Roots of ciliary ganglion
Trigeminal nerve (V)
Sensory root
Motor root
Ganglion
Internal carotid artery and plexus
Geniculate ganglion
Facial nerve (VII)
Vestibulocochlear nerve (VIII)
Glossopharyngeal nerve (IX)
Vagus nerve (X)
Mandibular nerve (V_3)
Otic ganglion
Internal carotid nerve
Chorda tympani nerve
Superior laryngeal nerve (*cut*)
Superior cervical sympathetic ganglion
Internal carotid artery and plexus
Carotid branch of glossopharyngeal nerve
Carotid sinus
Cervical sympathetic trunk
Superior cervical cardiac branch of vagus nerve
Ciliary ganglion
Long ciliary nerve
Short ciliary nerves
Posterior superior and inferior lateral nasal nerves
Pterygopalatine ganglion
Greater and lesser palatine nerves
Lingual nerve
Inferior alveolar nerve
Submandibular ganglion
Pharyngeal plexus
Maxillary artery and plexus
Middle meningeal artery and plexus
Facial artery and plexus
External carotid artery and plexus
Common carotid artery and plexus
Superior cervical sympathetic cardiac nerve
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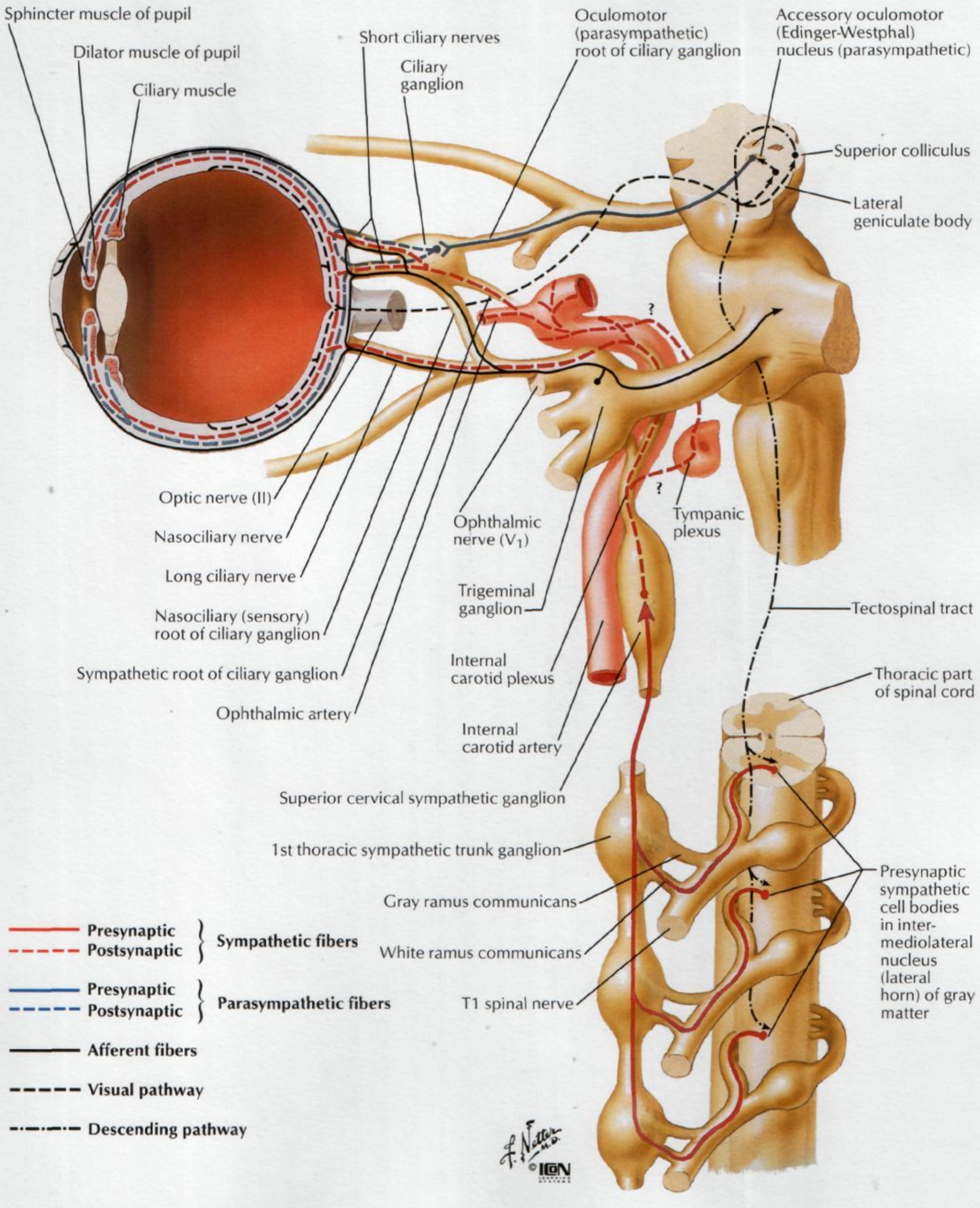
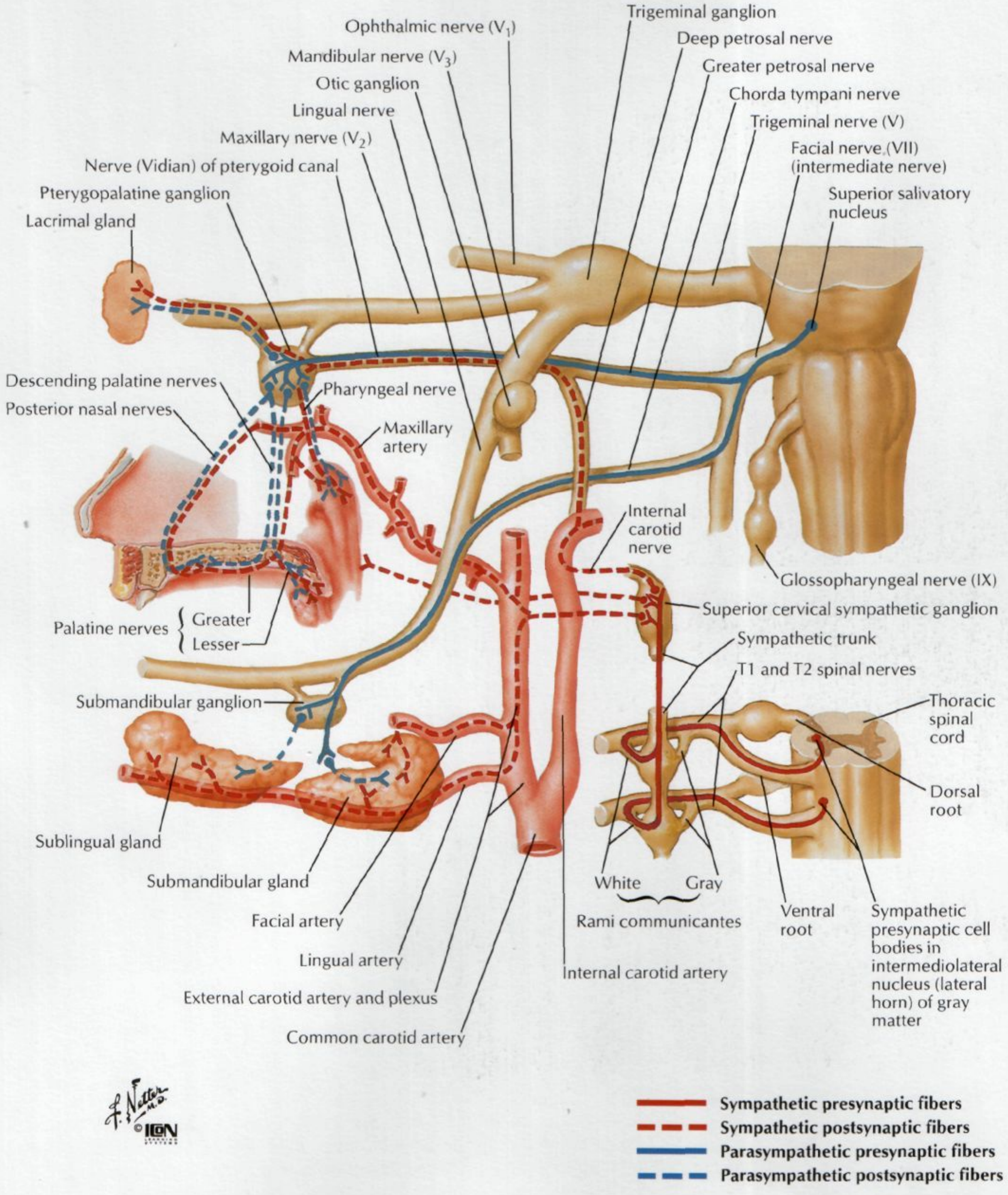
Ciliary Ganglion: Schema

SEE ALSO PLATE 160



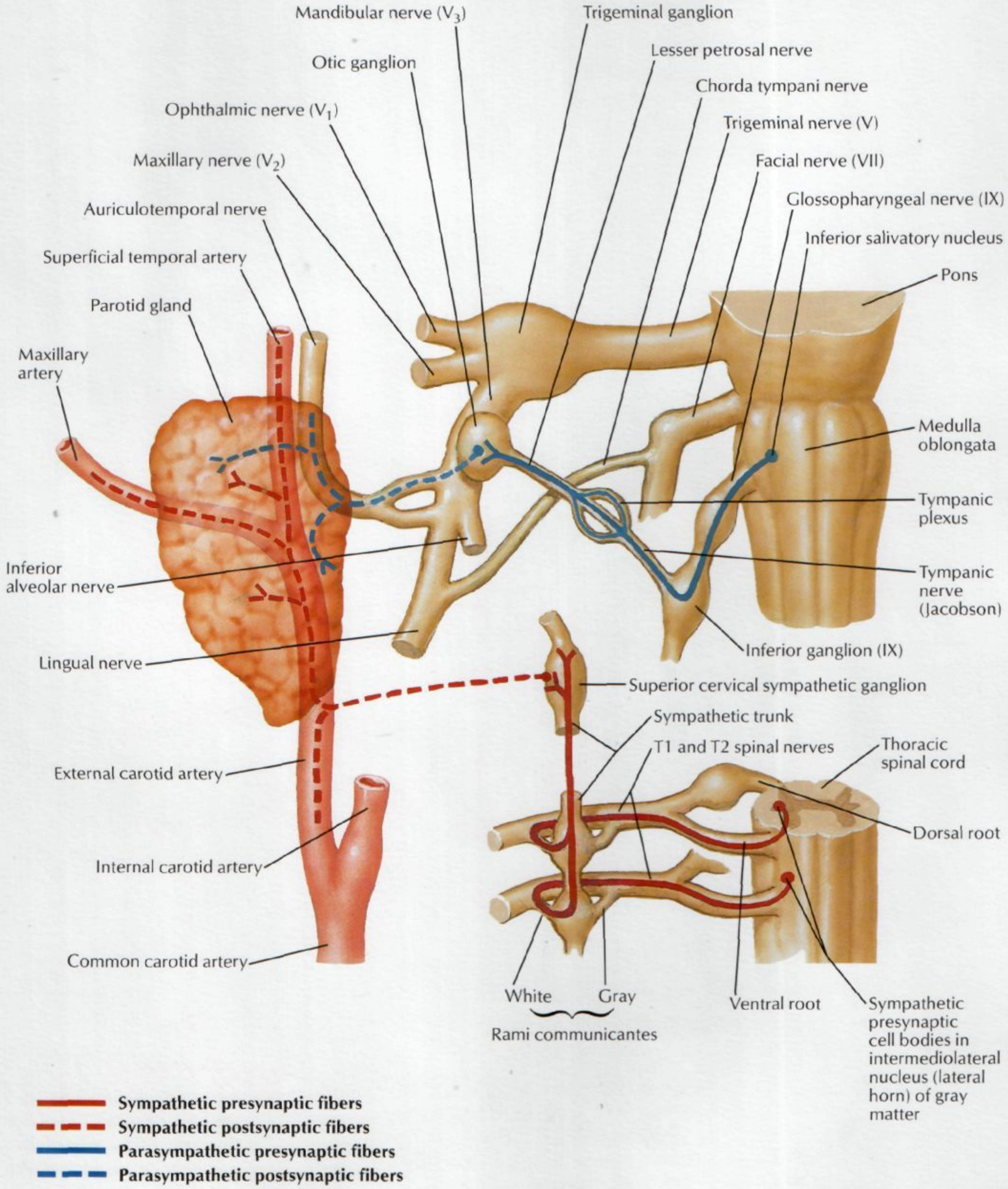
Pterygopalatine and Submandibular Ganglia: Schema

SEE ALSO PLATE 160



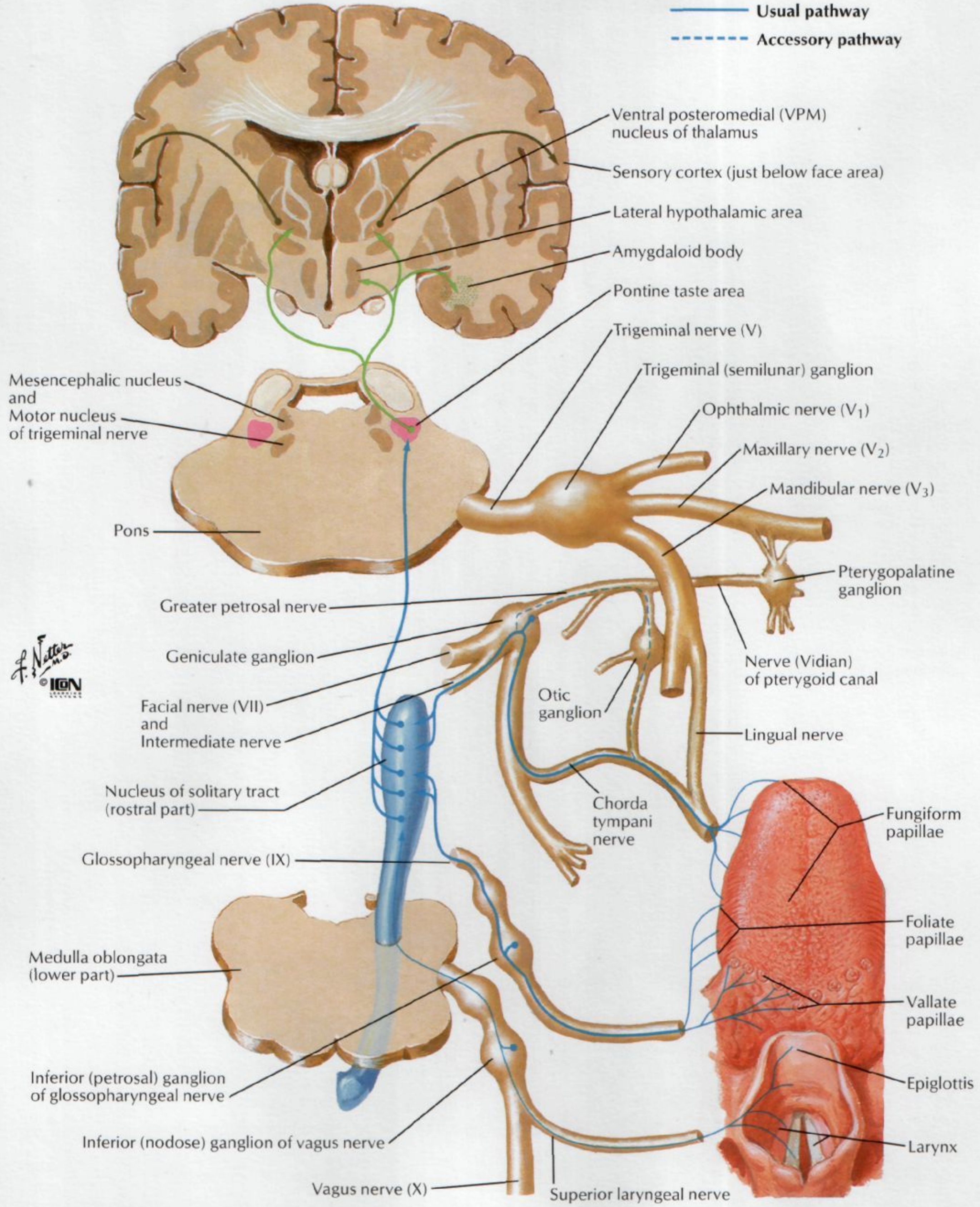
Otic Ganglion: Schema

SEE ALSO PLATE 160



Taste Pathways: Schema

SEE ALSO PLATES 42, 89, 117, 119, 120



Usual pathway
Accessory pathway
Ventral posteromedial (VPM) nucleus of thalamus
Sensory cortex (just below face area)
Lateral hypothalamic area
Amygdaloid body
Pontine taste area
Trigeminal nerve (V)
Trigeminal (semilunar) ganglion
Ophthalmic nerve (V_1)
Maxillary nerve (V_2)
Mandibular nerve (V_3)
Pterygopalatine ganglion
Nerve (Vidian) of pterygoid canal
Lingual nerve
Otic ganglion
Chorda tympani nerve
Fungiform papillae
Foliate papillae
Vallate papillae
Epiglottis
Larynx
Superior laryngeal nerve
Vagus nerve (X)
Inferior (nodose) ganglion of vagus nerve
Inferior (petrosal) ganglion of glossopharyngeal nerve
Medulla oblongata (lower part)
Glossopharyngeal nerve (IX)
Nucleus of solitary tract (rostral part)
Facial nerve (VII) and Intermediate nerve
Geniculate ganglion
Greater petrosal nerve
Pons
Mesencephalic nucleus and Motor nucleus of trigeminal nerve
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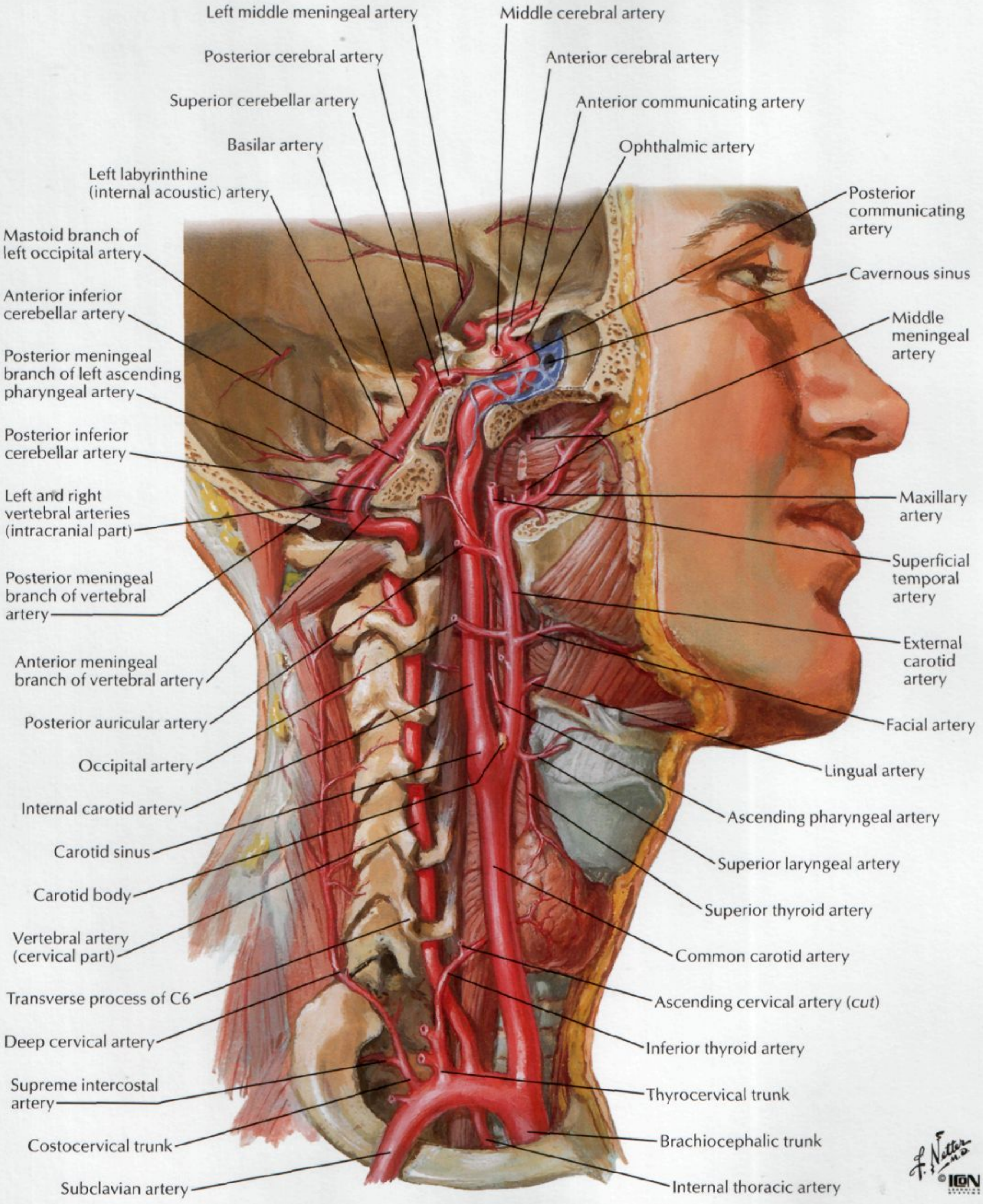
Arteries to Brain and Meninges

SEE ALSO PLATES 29, 30


Left middle meningeal artery
Middle cerebral artery
Posterior cerebral artery
Anterior cerebral artery
Superior cerebellar artery
Anterior communicating artery
Basilar artery
Ophthalmic artery
Left labyrinthine (internal acoustic) artery
Posterior communicating artery
Mastoid branch of left occipital artery
Cavernous sinus
Anterior inferior cerebellar artery
Middle meningeal artery
Posterior meningeal branch of left ascending pharyngeal artery
Posterior inferior cerebellar artery
Left and right vertebral arteries (intracranial part)
Maxillary artery
Posterior meningeal branch of vertebral artery
Superficial temporal artery
Anterior meningeal branch of vertebral artery
External carotid artery
Posterior auricular artery
Facial artery
Occipital artery
Lingual artery
Internal carotid artery
Ascending pharyngeal artery
Carotid sinus
Superior laryngeal artery
Carotid body
Superior thyroid artery
Vertebral artery (cervical part)
Common carotid artery
Transverse process of C6
Ascending cervical artery (*cut*)
Deep cervical artery
Inferior thyroid artery
Supreme intercostal artery
Thyrocervical trunk
Costocervical trunk
Brachiocephalic trunk
Subclavian artery
Internal thoracic artery
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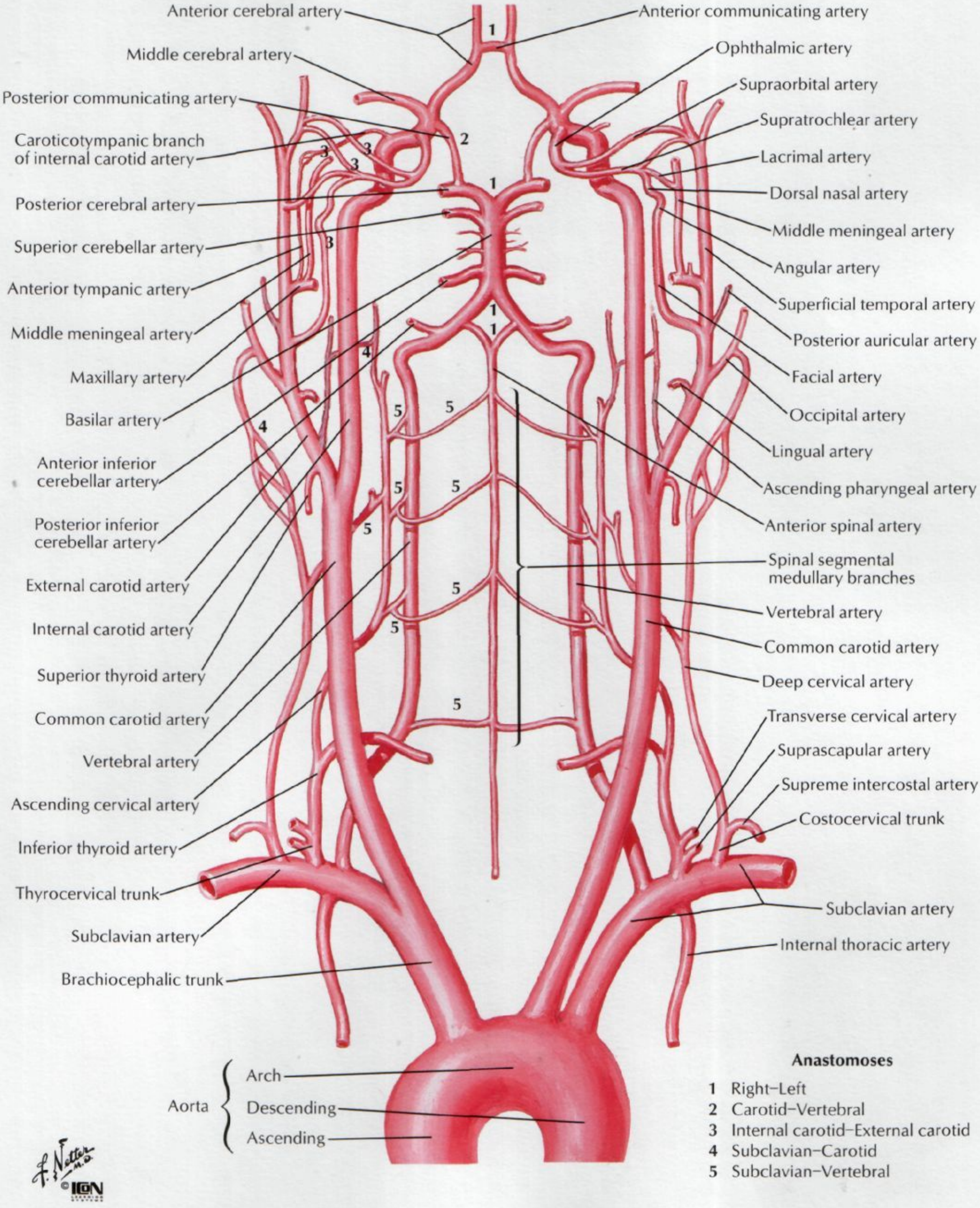
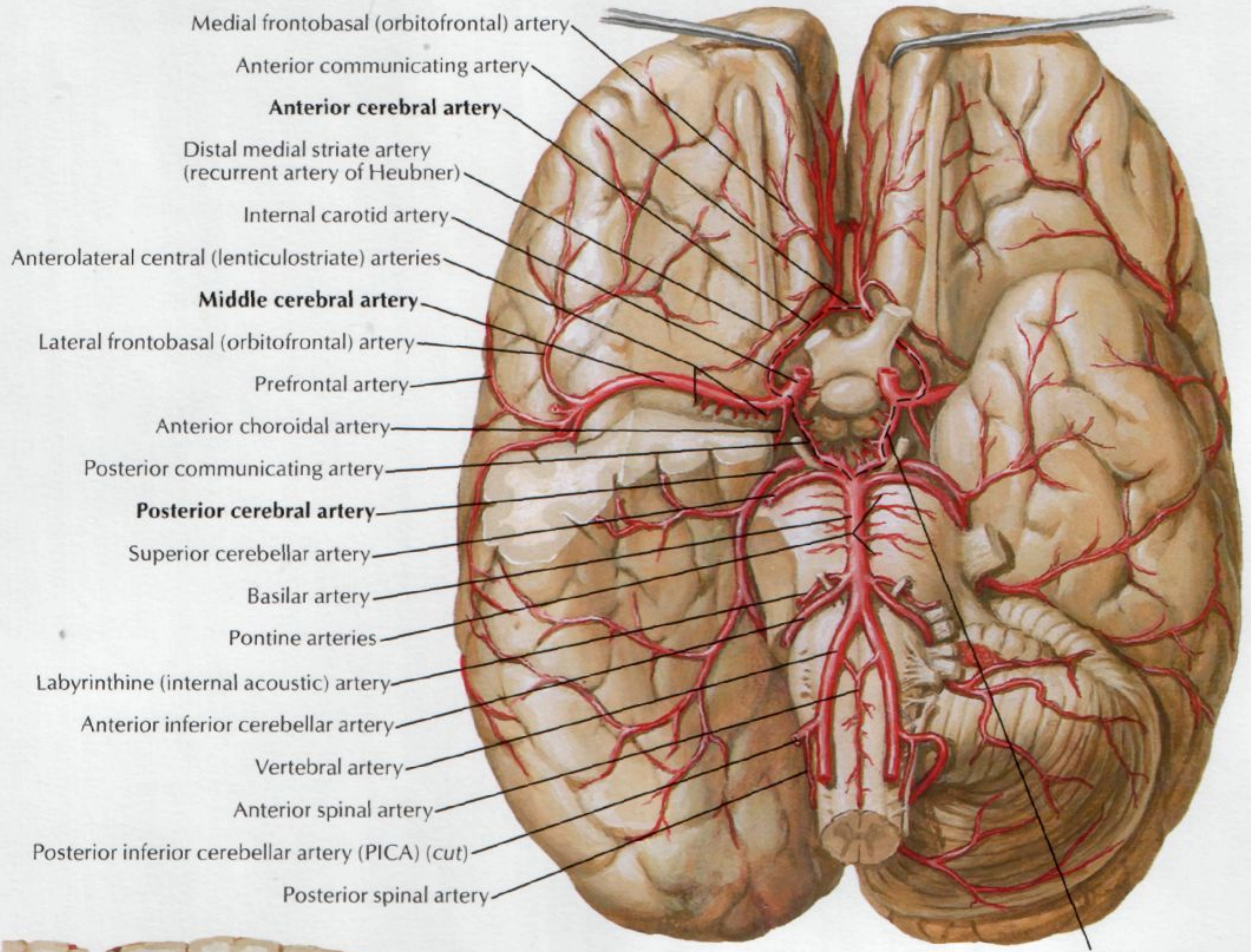
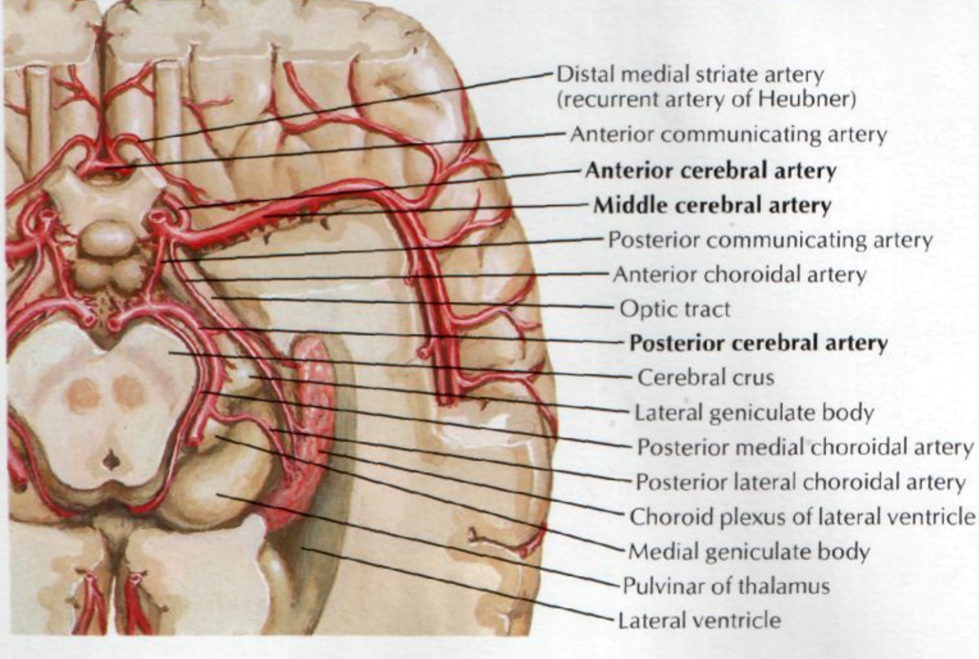
Arteries to Brain: Schema



Arteries of Brain: Inferior Views


Medial frontobasal (orbitofrontal) artery
Anterior communicating artery
Anterior cerebral artery
Distal medial striate artery (recurrent artery of Heubner)
Internal carotid artery
Anterolateral central (lenticulostriate) arteries
Middle cerebral artery
Lateral frontobasal (orbitofrontal) artery
Prefrontal artery
Anterior choroidal artery
Posterior communicating artery
Posterior cerebral artery
Superior cerebellar artery
Basilar artery
Pontine arteries
Labyrinthine (internal acoustic) artery
Anterior inferior cerebellar artery
Vertebral artery
Anterior spinal artery
Posterior inferior cerebellar artery (PICA) (*cut*)
Posterior spinal artery
Cerebral arterial circle (Willis) (*broken line*)


Distal medial striate artery (recurrent artery of Heubner)
Anterior communicating artery
Anterior cerebral artery
Middle cerebral artery
Posterior communicating artery
Anterior choroidal artery
Optic tract
Posterior cerebral artery
Cerebral crus
Lateral geniculate body
Posterior medial choroidal artery
Posterior lateral choroidal artery
Choroid plexus of lateral ventricle
Medial geniculate body
Pulvinar of thalamus
Lateral ventricle

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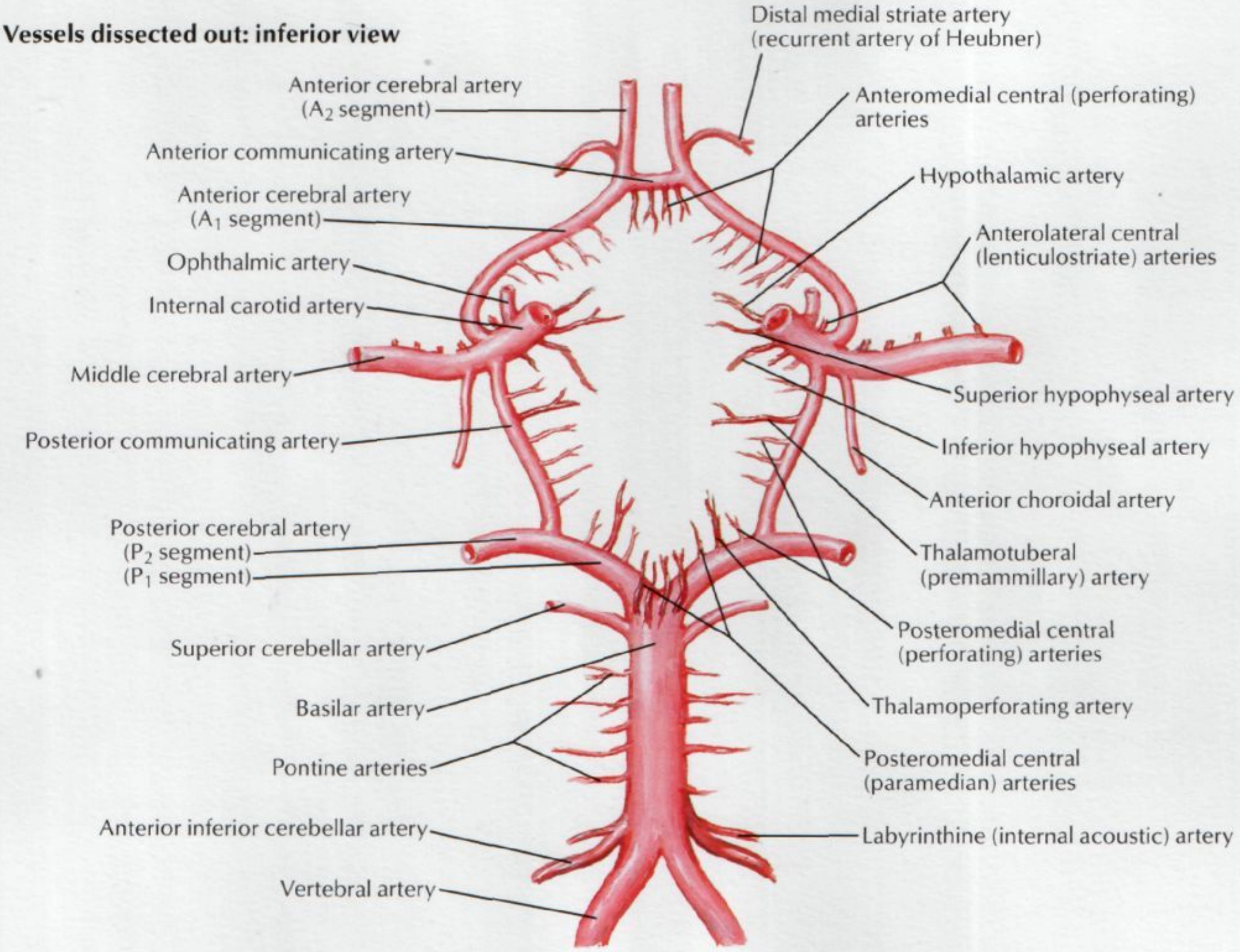
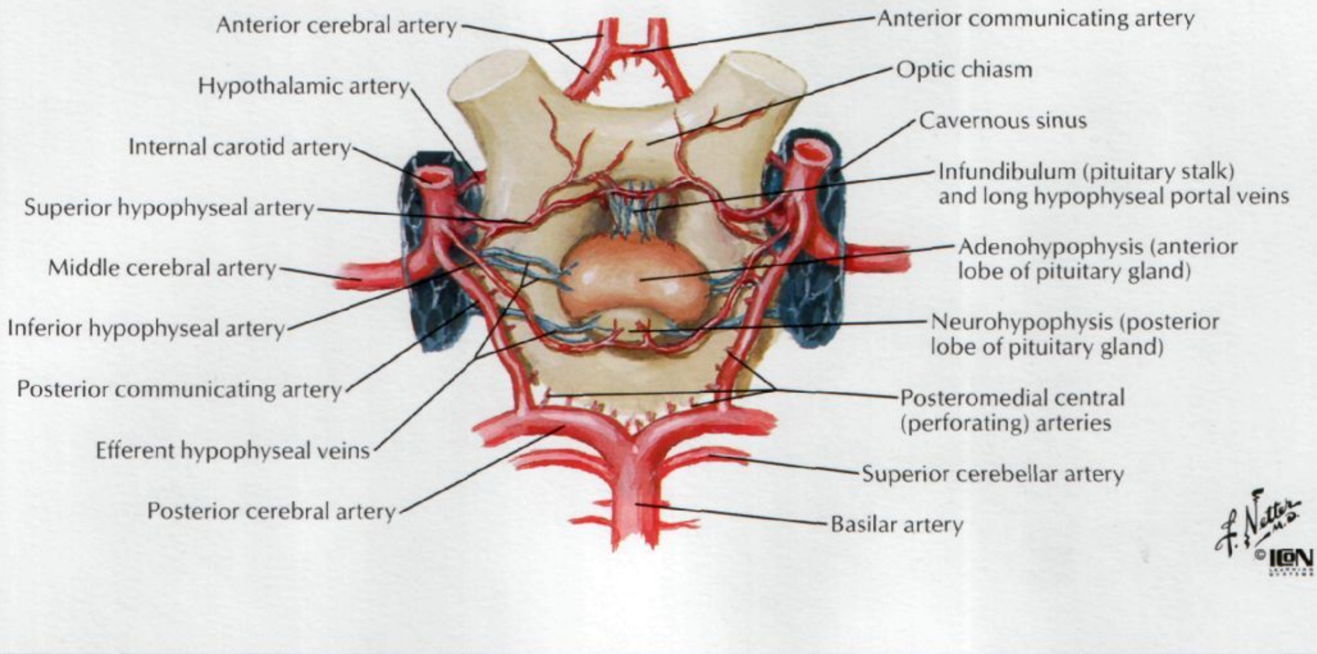
Cerebral Arterial Circle (Willis)

FOR HYPOPHYSEAL ARTERIES SEE PLATE 141

Vessels dissected out: inferior view


Distal medial striate artery (recurrent artery of Heubner)
Anterior cerebral artery (A_2 segment)
Anteromedial central (perforating) arteries
Anterior communicating artery
Hypothalamic artery
Anterior cerebral artery (A_1 segment)
Anterolateral central (lenticulostriate) arteries
Ophthalmic artery
Internal carotid artery
Middle cerebral artery
Superior hypophyseal artery
Posterior communicating artery
Inferior hypophyseal artery
Anterior choroidal artery
Posterior cerebral artery
(P_2 segment)
(P_1 segment)
Thalamotuberal (premammillary) artery
Posteromedial central (perforating) arteries
Superior cerebellar artery
Basilar artery
Thalamoperforating artery
Pontine arteries
Posteromedial central (paramedian) arteries
Anterior inferior cerebellar artery
Labyrinthine (internal acoustic) artery
Vertebral artery

Vessels in situ: inferior view


Anterior cerebral artery
Anterior communicating artery
Hypothalamic artery
Optic chiasm
Cavernous sinus
Internal carotid artery
Infundibulum (pituitary stalk) and long hypophyseal portal veins
Superior hypophyseal artery
Adenohypophysis (anterior lobe of pituitary gland)
Middle cerebral artery
Inferior hypophyseal artery
Neurohypophysis (posterior lobe of pituitary gland)
Posterior communicating artery
Posteromedial central (perforating) arteries
Efferent hypophyseal veins
Superior cerebellar artery
Posterior cerebral artery
Basilar artery
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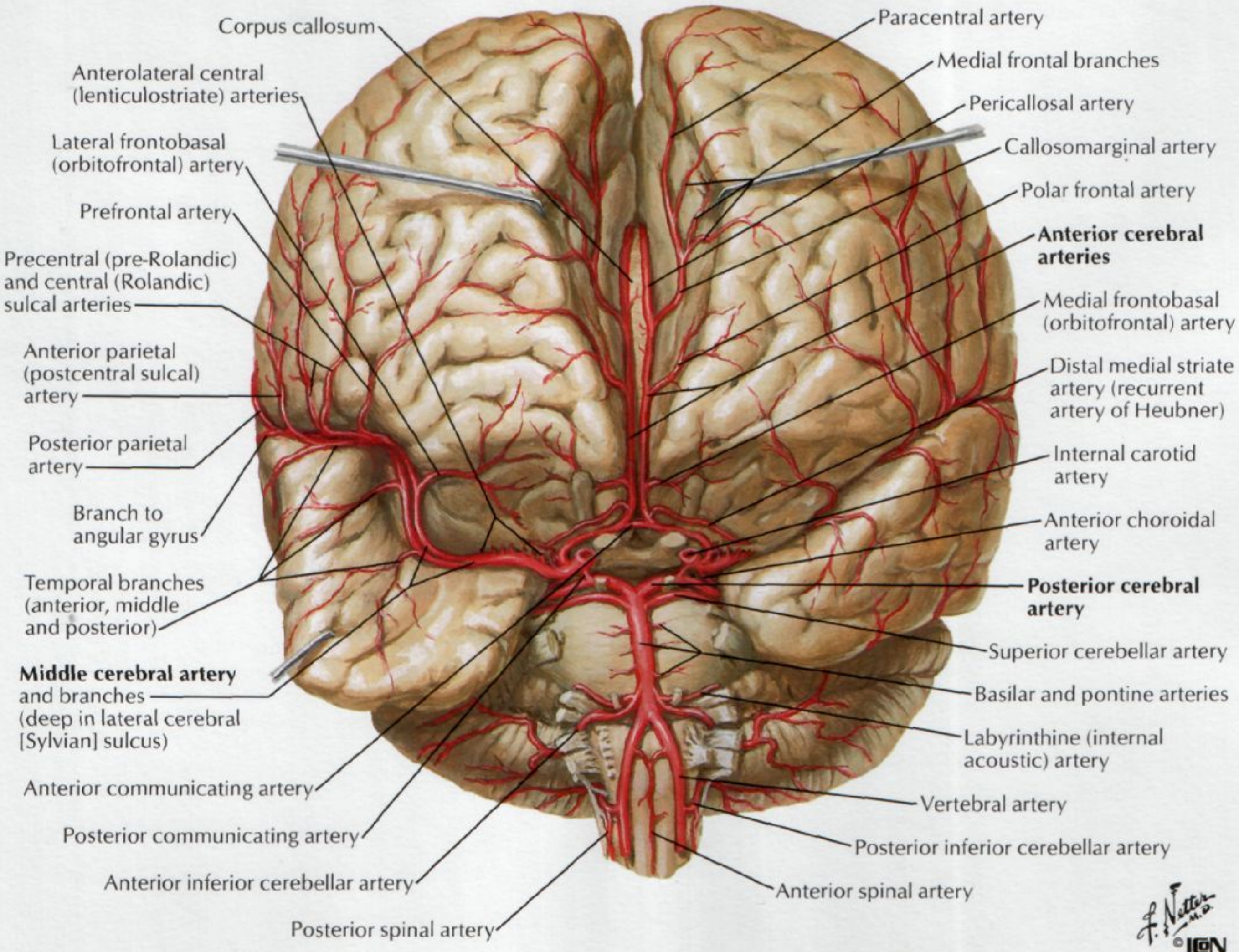
Arteries of Brain: Frontal View and Section


Corpus callosum
Anterolateral central (lenticulostriate) arteries
Lateral frontobasal (orbitofrontal) artery
Prefrontal artery
Precentral (pre-Rolandic) and central (Rolandic) sulcal arteries
Anterior parietal (postcentral sulcal) artery
Posterior parietal artery
Branch to angular gyrus
Temporal branches (anterior, middle and posterior)
Middle cerebral artery and branches (deep in lateral cerebral [Sylvian] sulcus)
Anterior communicating artery
Posterior communicating artery
Anterior inferior cerebellar artery
Posterior spinal artery
Paracentral artery
Medial frontal branches
Pericallosal artery
Callosomarginal artery
Polar frontal artery
Anterior cerebral arteries
Medial frontobasal (orbitofrontal) artery
Distal medial striate artery (recurrent artery of Heubner)
Internal carotid artery
Anterior choroidal artery
Posterior cerebral artery
Superior cerebellar artery
Basilar and pontine arteries
Labyrinthine (internal acoustic) artery
Vertebral artery
Posterior inferior cerebellar artery
Anterior spinal artery
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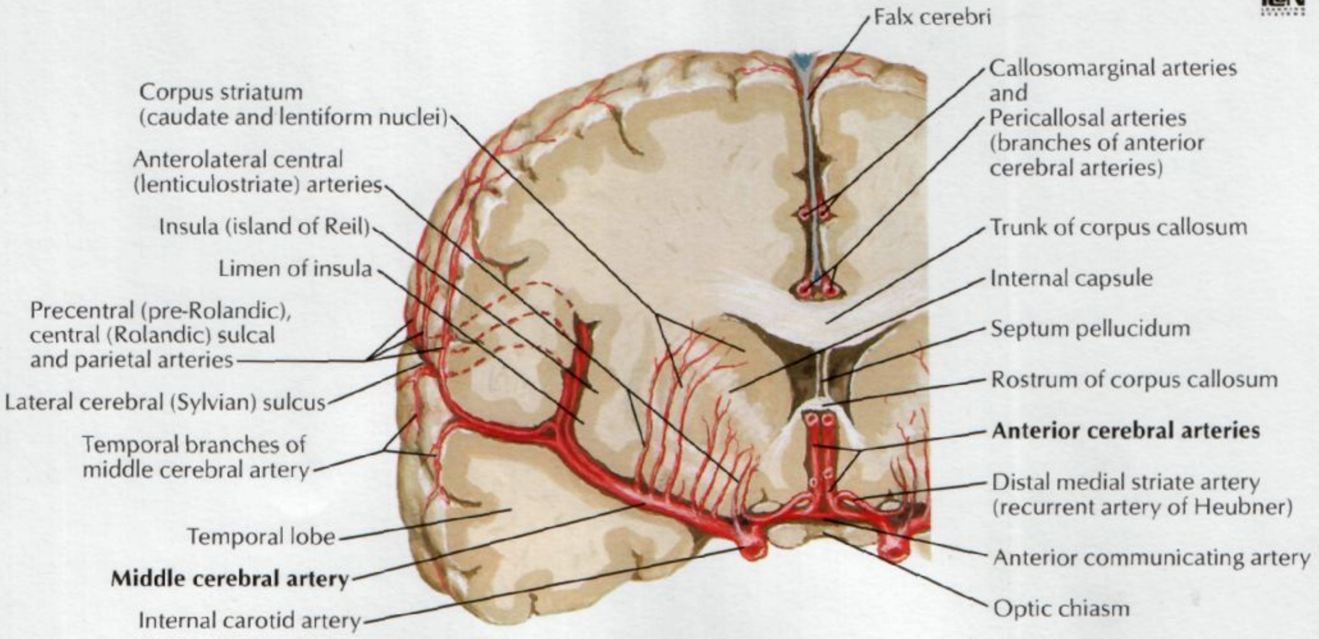
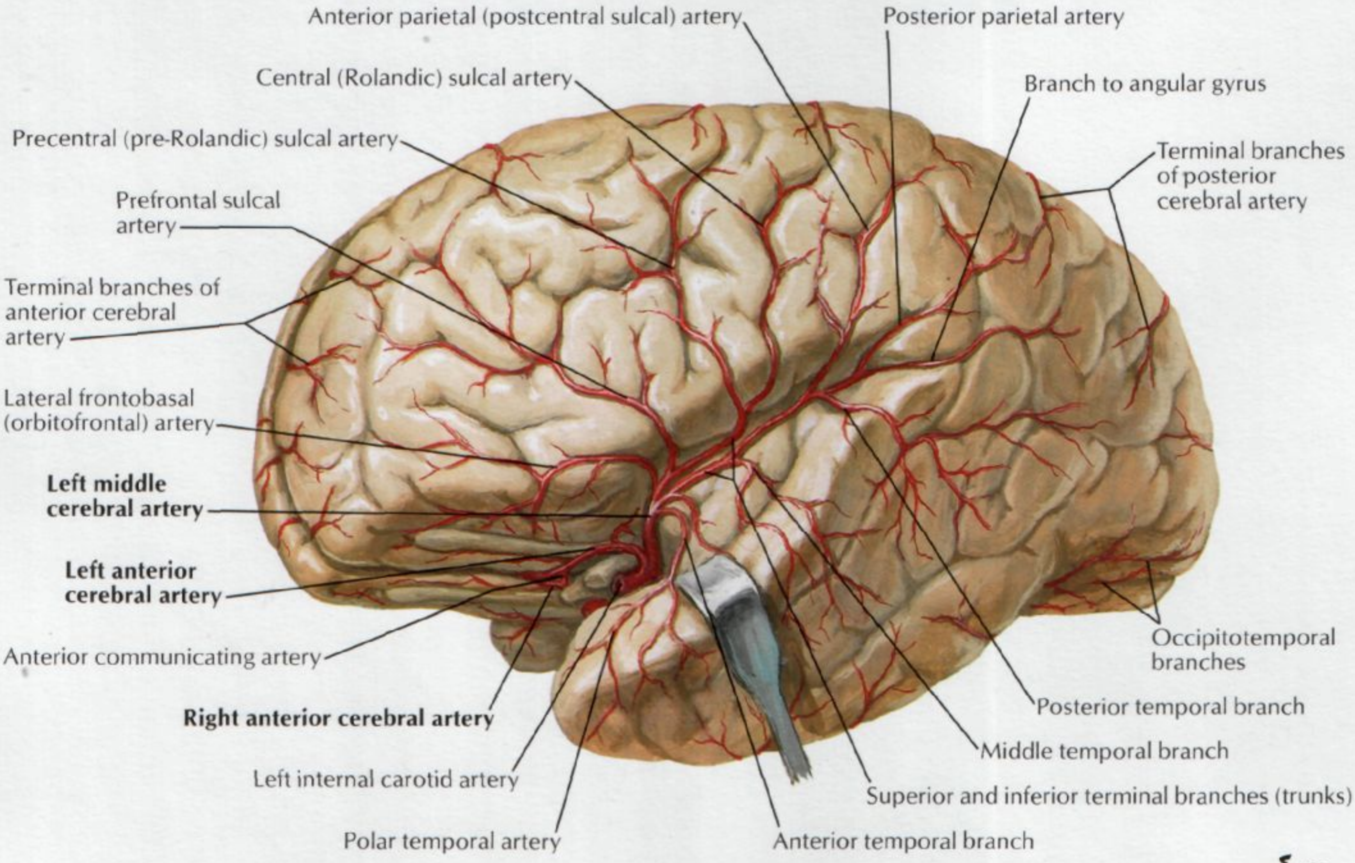

Falx cerebri
Corpus striatum (caudate and lentiform nuclei)
Anterolateral central (lenticulostriate) arteries
Insula (island of Reil)
Limen of insula
Precentral (pre-Rolandic), central (Rolandic) sulcal and parietal arteries
Lateral cerebral (Sylvian) sulcus
Temporal branches of middle cerebral artery
Temporal lobe
Middle cerebral artery
Internal carotid artery
Callosomarginal arteries and Pericallosal arteries (branches of anterior cerebral arteries)
Trunk of corpus callosum
Internal capsule
Septum pellucidum
Rostrum of corpus callosum
Anterior cerebral arteries
Distal medial striate artery (recurrent artery of Heubner)
Anterior communicating artery
Optic chiasm

Arteries of Brain: Lateral and Medial Views


Anterior parietal (postcentral sulcal) artery
Posterior parietal artery
Central (Rolandic) sulcal artery
Branch to angular gyrus
Precentral (pre-Rolandic) sulcal artery
Terminal branches of posterior cerebral artery
Prefrontal sulcal artery
Terminal branches of anterior cerebral artery
Lateral frontobasal (orbitofrontal) artery
Left middle cerebral artery
Left anterior cerebral artery
Occipitotemporal branches
Anterior communicating artery
Posterior temporal branch
Right anterior cerebral artery
Middle temporal branch
Left internal carotid artery
Superior and inferior terminal branches (trunks)
Polar temporal artery
Anterior temporal branch

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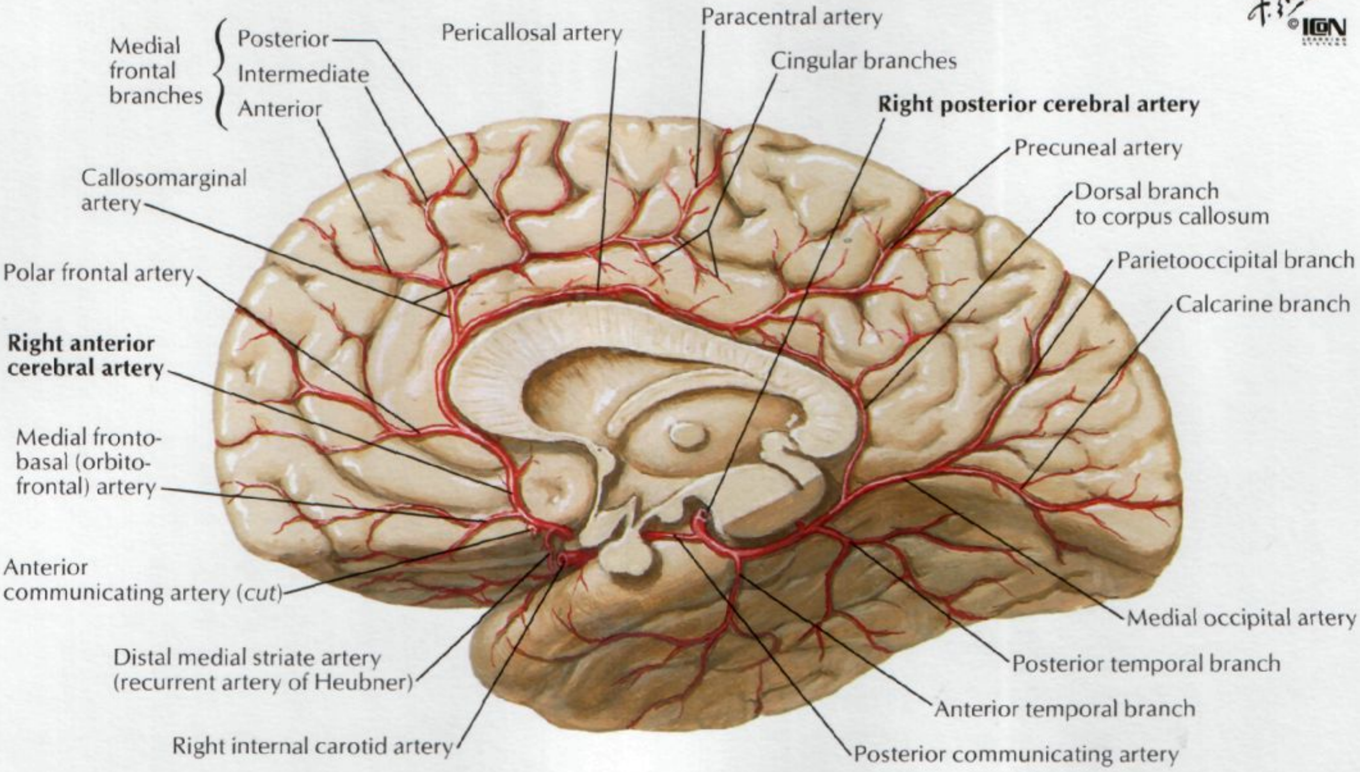
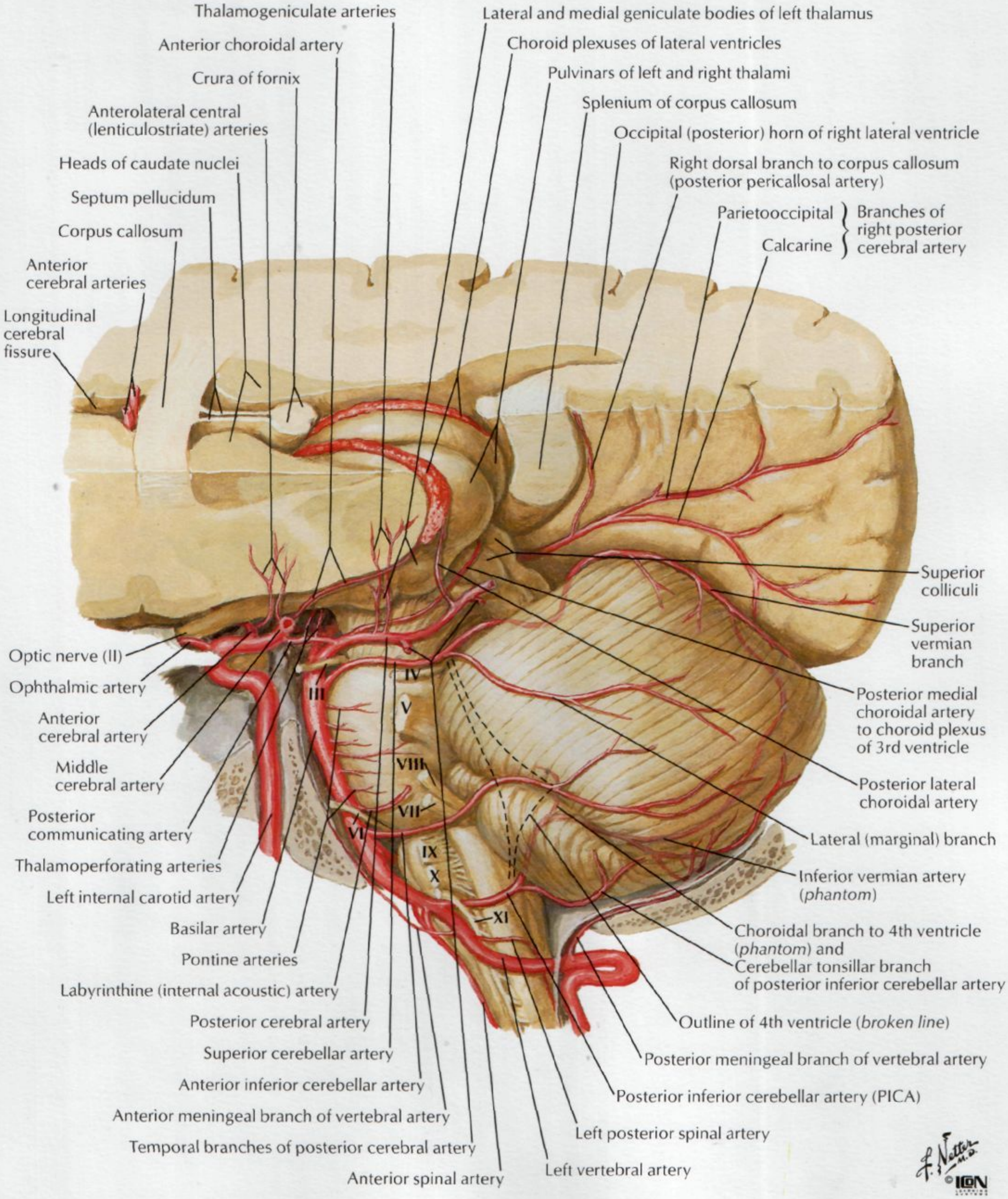
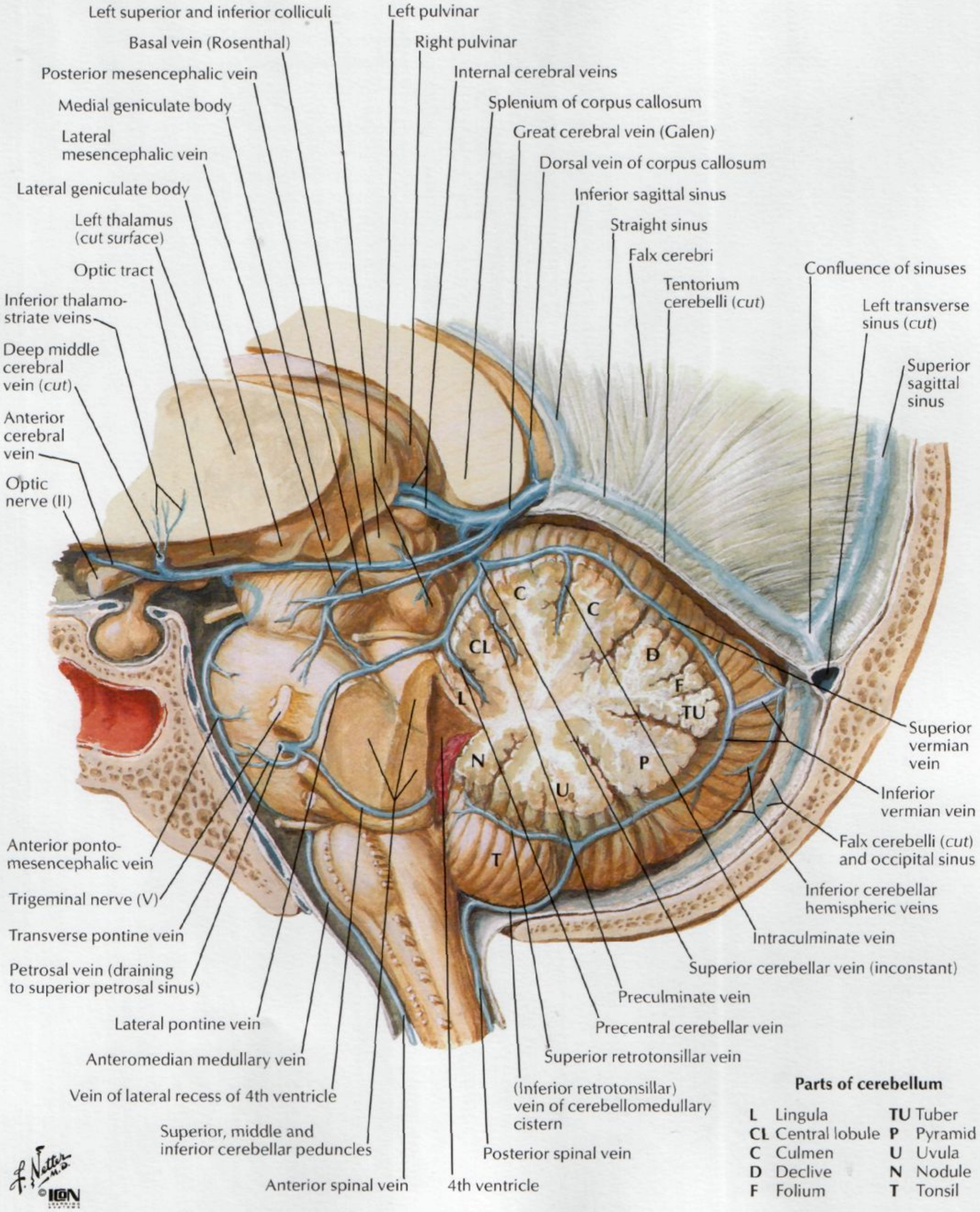

Medial frontal branches
Posterior
Intermediate
Anterior
Pericallosal artery
Paracentral artery
Cingular branches
Right posterior cerebral artery
Precuneal artery
Callosomarginal artery
Dorsal branch to corpus callosum
Parietooccipital branch
Polar frontal artery
Calcarine branch
Right anterior cerebral artery
Medial frontobasal (orbitofrontal) artery
Anterior communicating artery (*cut*)
Medial occipital artery
Distal medial striate artery (recurrent artery of Heubner)
Posterior temporal branch
Anterior temporal branch
Right internal carotid artery
Posterior communicating artery

Note: Anterior parietal (postcentral sulcal) artery also occurs as separate anterior parietal and postcentral sulcal arteries

Arteries of Posterior Cranial Fossa


Thalamogeniculate arteries
Anterior choroidal artery
Crura of fornix
Anterolateral central (lenticulostriate) arteries
Heads of caudate nuclei
Septum pellucidum
Corpus callosum
Anterior cerebral arteries
Longitudinal cerebral fissure
Lateral and medial geniculate bodies of left thalamus
Choroid plexuses of lateral ventricles
Pulvinars of left and right thalami
Splenium of corpus callosum
Occipital (posterior) horn of right lateral ventricle
Right dorsal branch to corpus callosum (posterior pericallosal artery)
Parietooccipital
Calcarine
Branches of right posterior cerebral artery
Superior colliculi
Superior vermian branch
Posterior medial choroidal artery to choroid plexus of 3rd ventricle
Posterior lateral choroidal artery
Lateral (marginal) branch
Inferior vermian artery (*phantom*)
Choroidal branch to 4th ventricle (*phantom*) and
Cerebellar tonsillar branch of posterior inferior cerebellar artery
Outline of 4th ventricle (*broken line*)
Posterior meningeal branch of vertebral artery
Posterior inferior cerebellar artery (PICA)
Left posterior spinal artery
Left vertebral artery
Optic nerve (II)
Ophthalmic artery
Anterior cerebral artery
Middle cerebral artery
Posterior communicating artery
Thalamoperforating arteries
Left internal carotid artery
Basilar artery
Pontine arteries
Labyrinthine (internal acoustic) artery
Posterior cerebral artery
Superior cerebellar artery
Anterior inferior cerebellar artery
Anterior meningeal branch of vertebral artery
Temporal branches of posterior cerebral artery
Anterior spinal artery
IV
V
III
VIII
VII
VI
IX
X
XI

Veins of Posterior Cranial Fossa

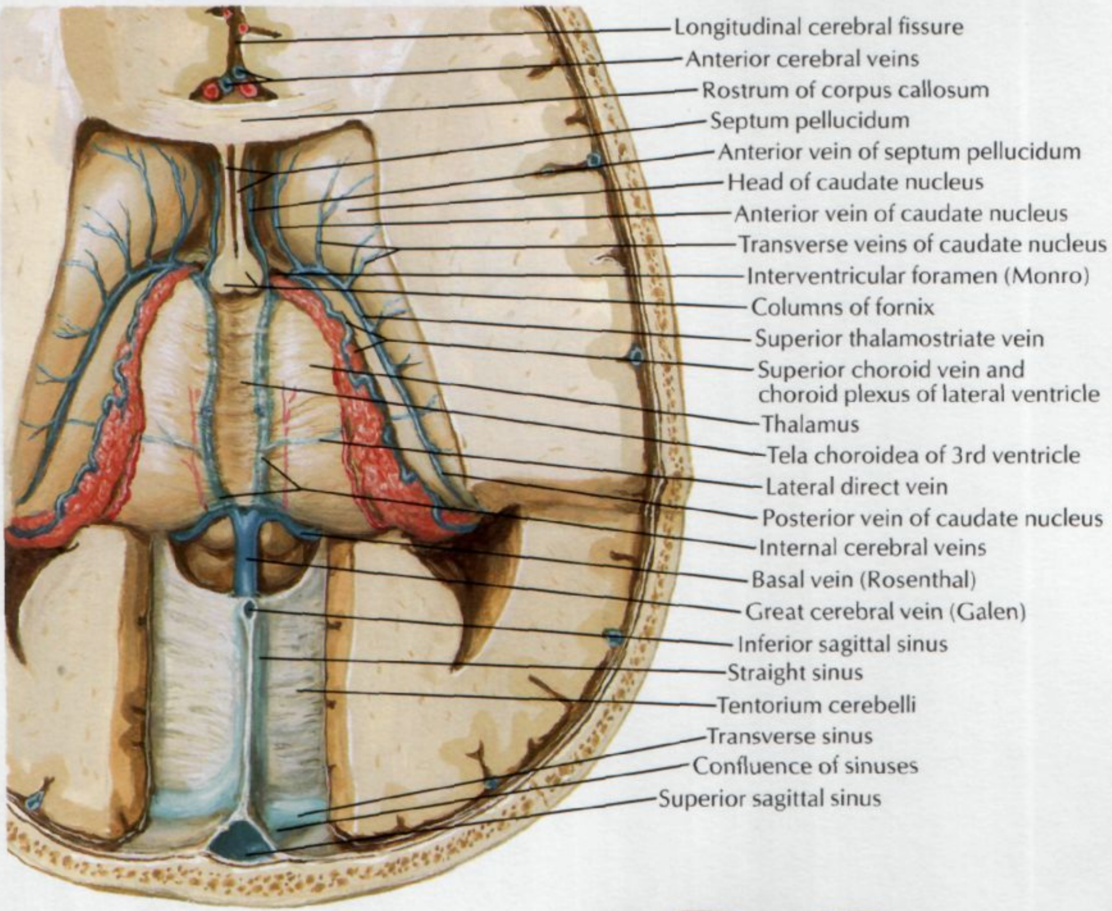

Left superior and inferior colliculi
Basal vein (Rosenthal)
Posterior mesencephalic vein
Medial geniculate body
Lateral mesencephalic vein
Lateral geniculate body
Left thalamus (cut surface)
Optic tract
Inferior thalamostriate veins
Deep middle cerebral vein (*cut*)
Anterior cerebral vein
Optic nerve (II)
Left pulvinar
Right pulvinar
Internal cerebral veins
Splenium of corpus callosum
Great cerebral vein (Galen)
Dorsal vein of corpus callosum
Inferior sagittal sinus
Straight sinus
Falx cerebri
Tentorium cerebelli (*cut*)
Confluence of sinuses
Left transverse sinus (*cut*)
Superior sagittal sinus
C
C
CL
D
F
TU
L
N
P
U
T
Superior vermian vein
Inferior vermian vein
Falx cerebelli (*cut*) and occipital sinus
Inferior cerebellar hemispheric veins
Intraculminate vein
Superior cerebellar vein (inconstant)
Preculminate vein
Precentral cerebellar vein
Superior retrotonsillar vein
(Inferior retrotonsillar) vein of cerebellomedullary cistern
Posterior spinal vein
4th ventricle
Anterior spinal vein
Superior, middle and inferior cerebellar peduncles
Vein of lateral recess of 4th ventricle
Anteromedian medullary vein
Lateral pontine vein
Petrosal vein (draining to superior petrosal sinus)
Transverse pontine vein
Trigeminal nerve (V)
Anterior pontomesencephalic vein

Parts of cerebellum

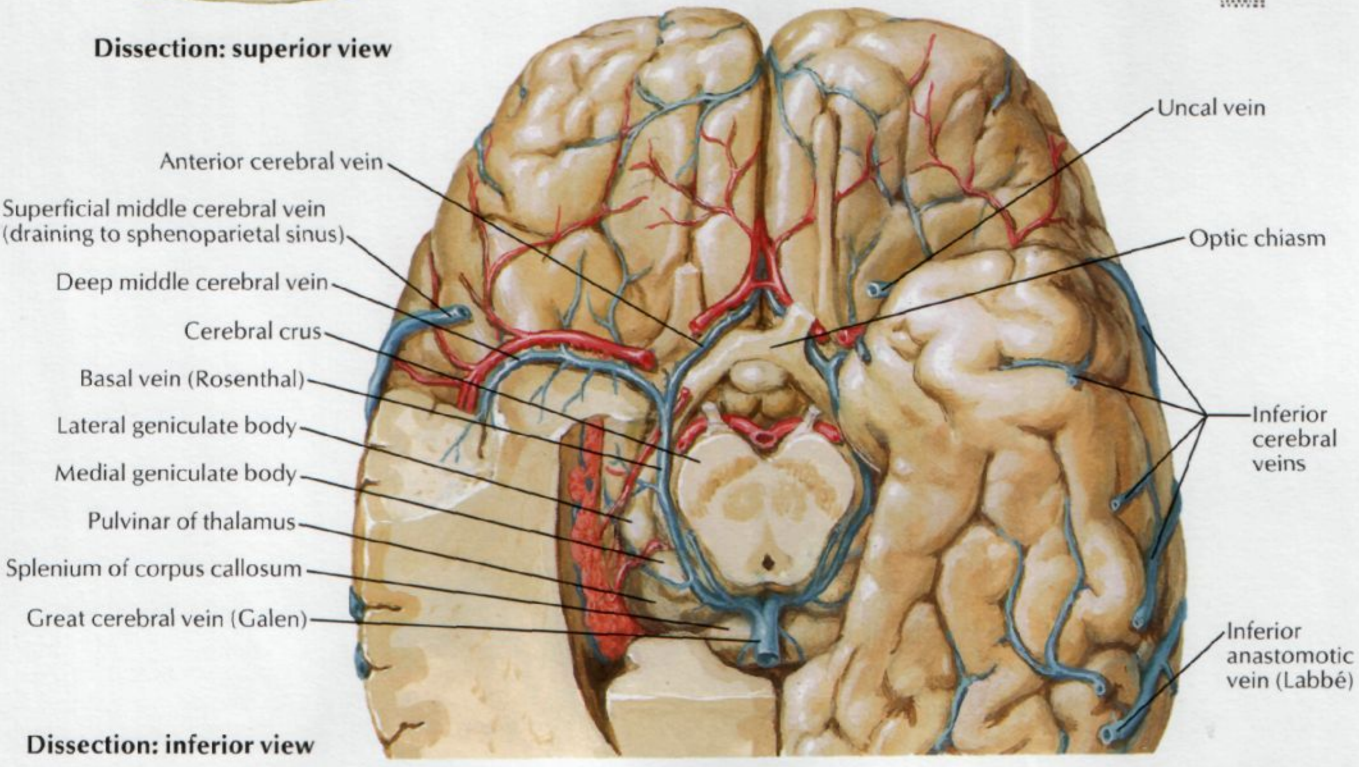
L	Lingula	**TU**	Tuber
CL	Central lobule	**P**	Pyramid
C	Culmen	**U**	Uvula
D	Declive	**N**	Nodule
F	Folium	**T**	Tonsil

Deep Veins of Brain

FOR SUPERFICIAL VEINS OF BRAIN SEE PLATE 96

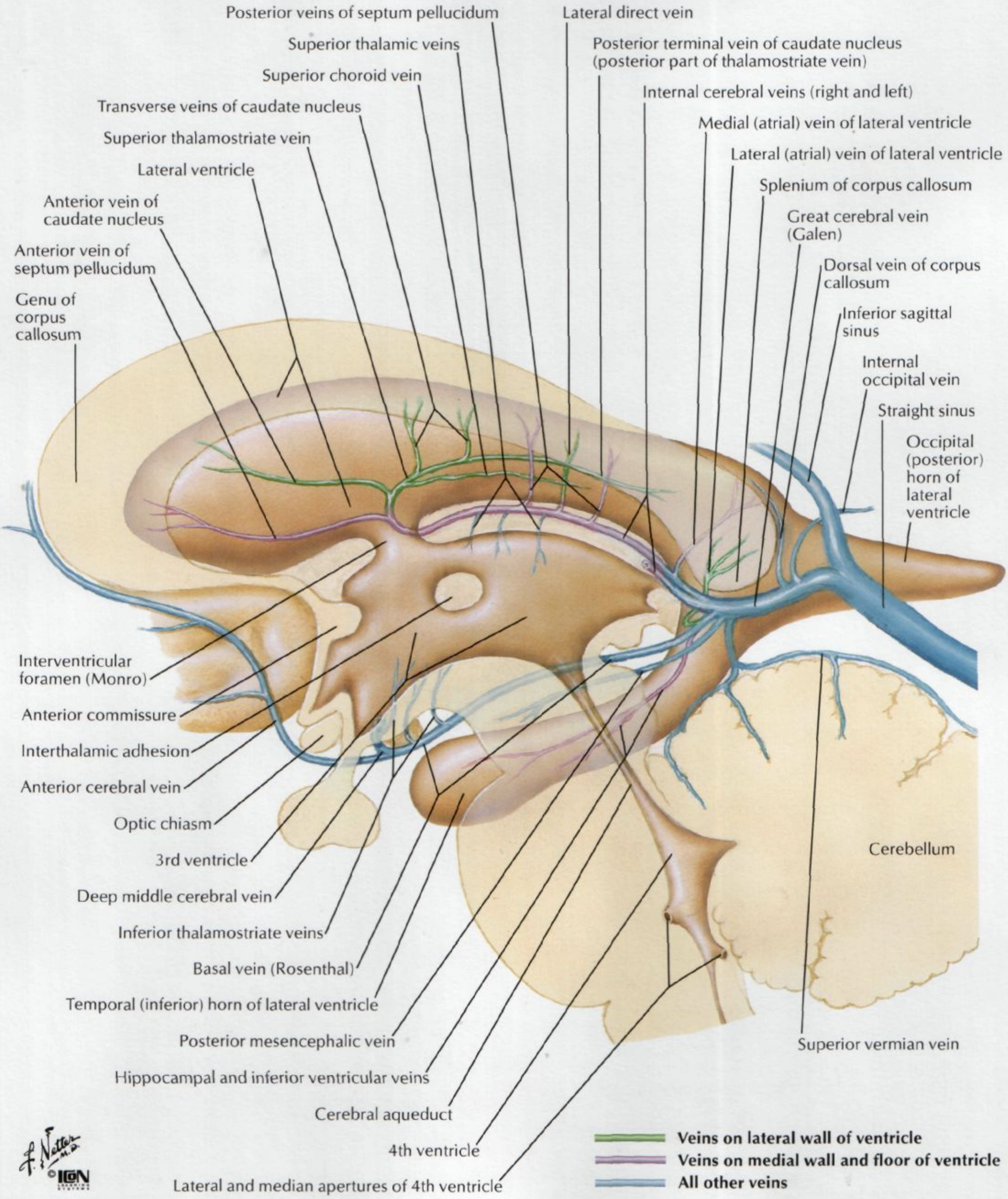

Longitudinal cerebral fissure
Anterior cerebral veins
Rostrum of corpus callosum
Septum pellucidum
Anterior vein of septum pellucidum
Head of caudate nucleus
Anterior vein of caudate nucleus
Transverse veins of caudate nucleus
Interventricular foramen (Monro)
Columns of fornix
Superior thalamostriate vein
Superior choroid vein and choroid plexus of lateral ventricle
Thalamus
Tela choroidea of 3rd ventricle
Lateral direct vein
Posterior vein of caudate nucleus
Internal cerebral veins
Basal vein (Rosenthal)
Great cerebral vein (Galen)
Inferior sagittal sinus
Straight sinus
Tentorium cerebelli
Transverse sinus
Confluence of sinuses
Superior sagittal sinus

Dissection: superior view


Anterior cerebral vein
Superficial middle cerebral vein (draining to sphenoparietal sinus)
Deep middle cerebral vein
Cerebral crus
Basal vein (Rosenthal)
Lateral geniculate body
Medial geniculate body
Pulvinar of thalamus
Splenium of corpus callosum
Great cerebral vein (Galen)
Uncal vein
Optic chiasm
Inferior cerebral veins
Inferior anastomotic vein (Labbé)

Dissection: inferior view

Subependymal Veins of Brain


Posterior veins of septum pellucidum
Superior thalamic veins
Superior choroid vein
Transverse veins of caudate nucleus
Superior thalamostriate vein
Lateral ventricle
Anterior vein of caudate nucleus
Anterior vein of septum pellucidum
Genu of corpus callosum
Lateral direct vein
Posterior terminal vein of caudate nucleus (posterior part of thalamostriate vein)
Internal cerebral veins (right and left)
Medial (atrial) vein of lateral ventricle
Lateral (atrial) vein of lateral ventricle
Splenium of corpus callosum
Great cerebral vein (Galen)
Dorsal vein of corpus callosum
Inferior sagittal sinus
Internal occipital vein
Straight sinus
Occipital (posterior) horn of lateral ventricle
Interventricular foramen (Monro)
Anterior commissure
Interthalamic adhesion
Anterior cerebral vein
Optic chiasm
3rd ventricle
Deep middle cerebral vein
Inferior thalamostriate veins
Basal vein (Rosenthal)
Temporal (inferior) horn of lateral ventricle
Posterior mesencephalic vein
Hippocampal and inferior ventricular veins
Cerebral aqueduct
4th ventricle
Lateral and median apertures of 4th ventricle
Cerebellum
Superior vermian vein
Veins on lateral wall of ventricle
Veins on medial wall and floor of ventricle
All other veins
F. Netter M.D.
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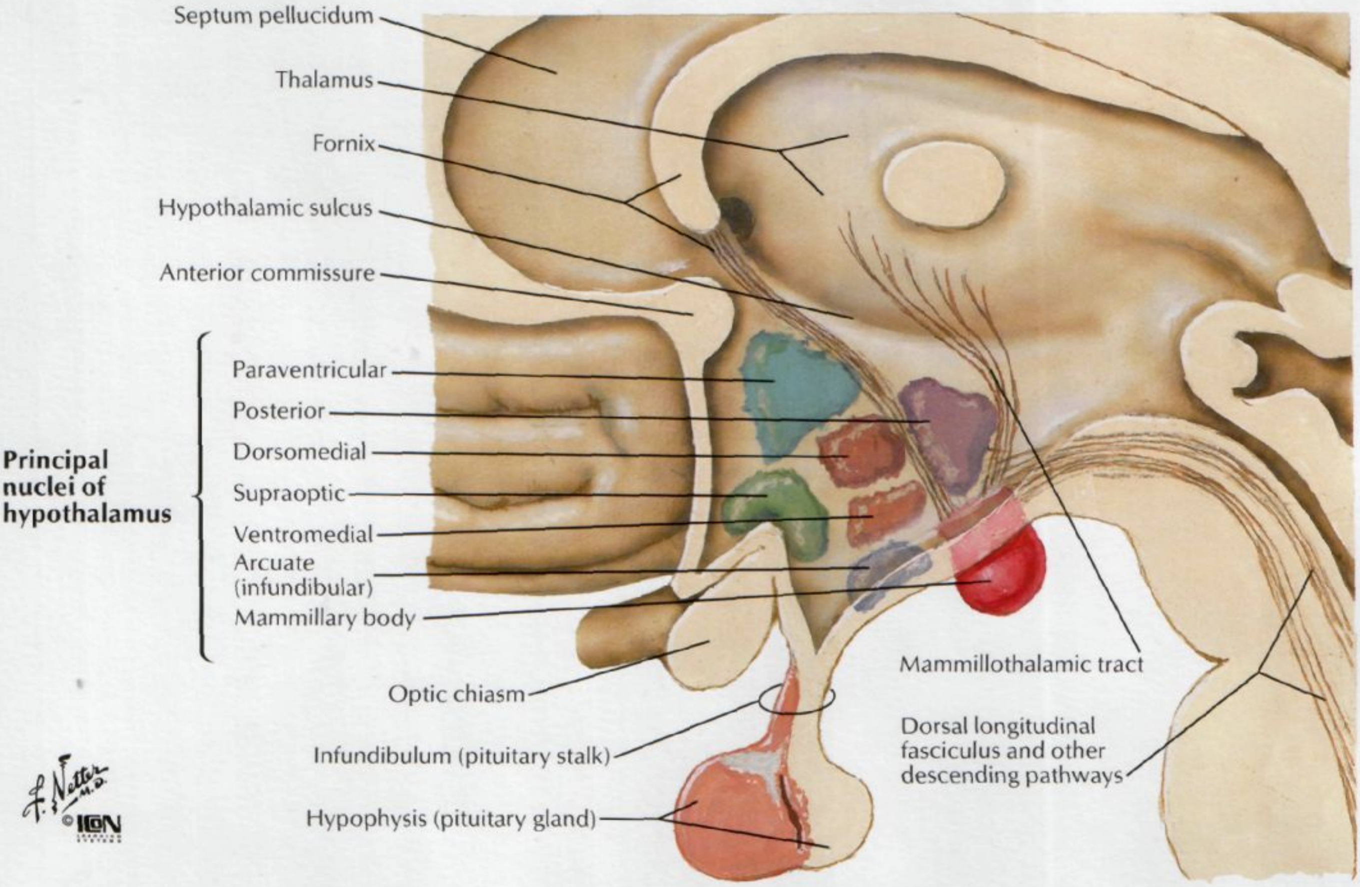
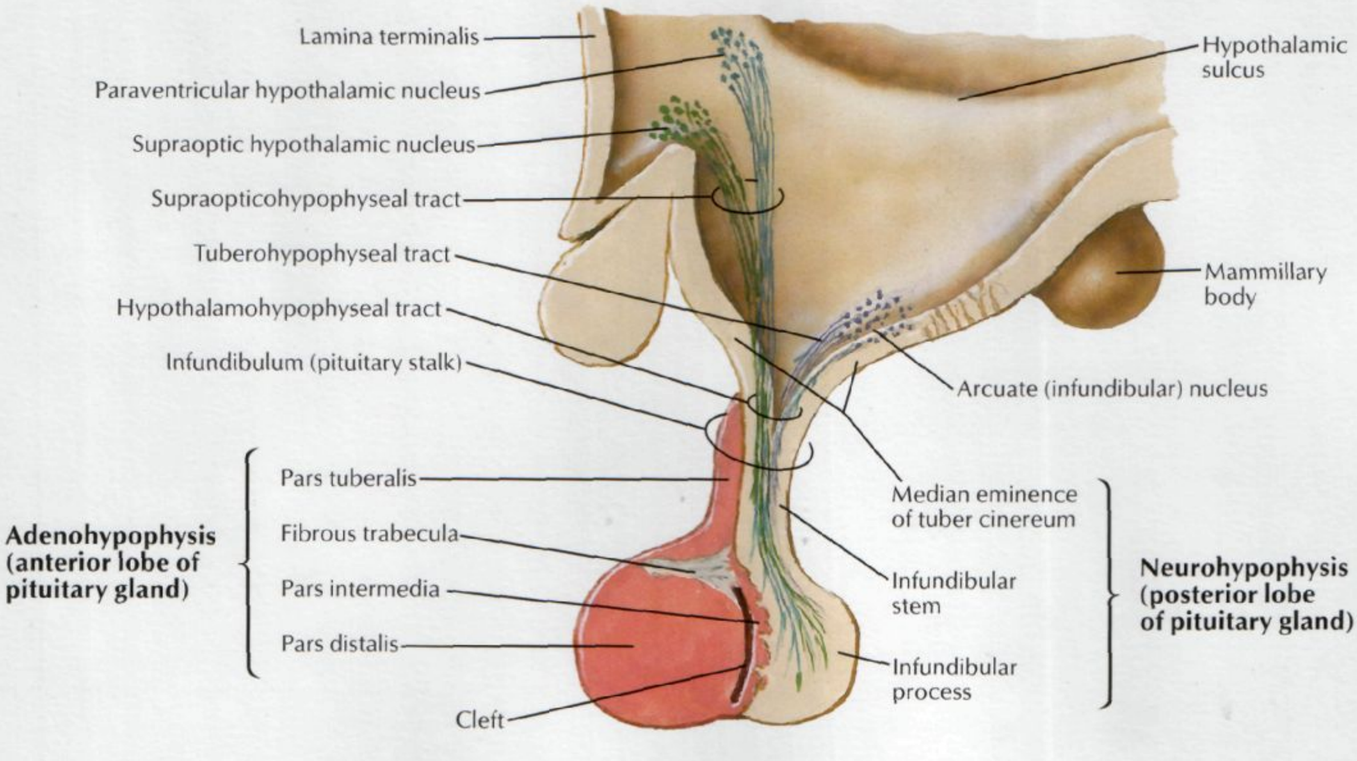
Hypothalamus and Hypophysis

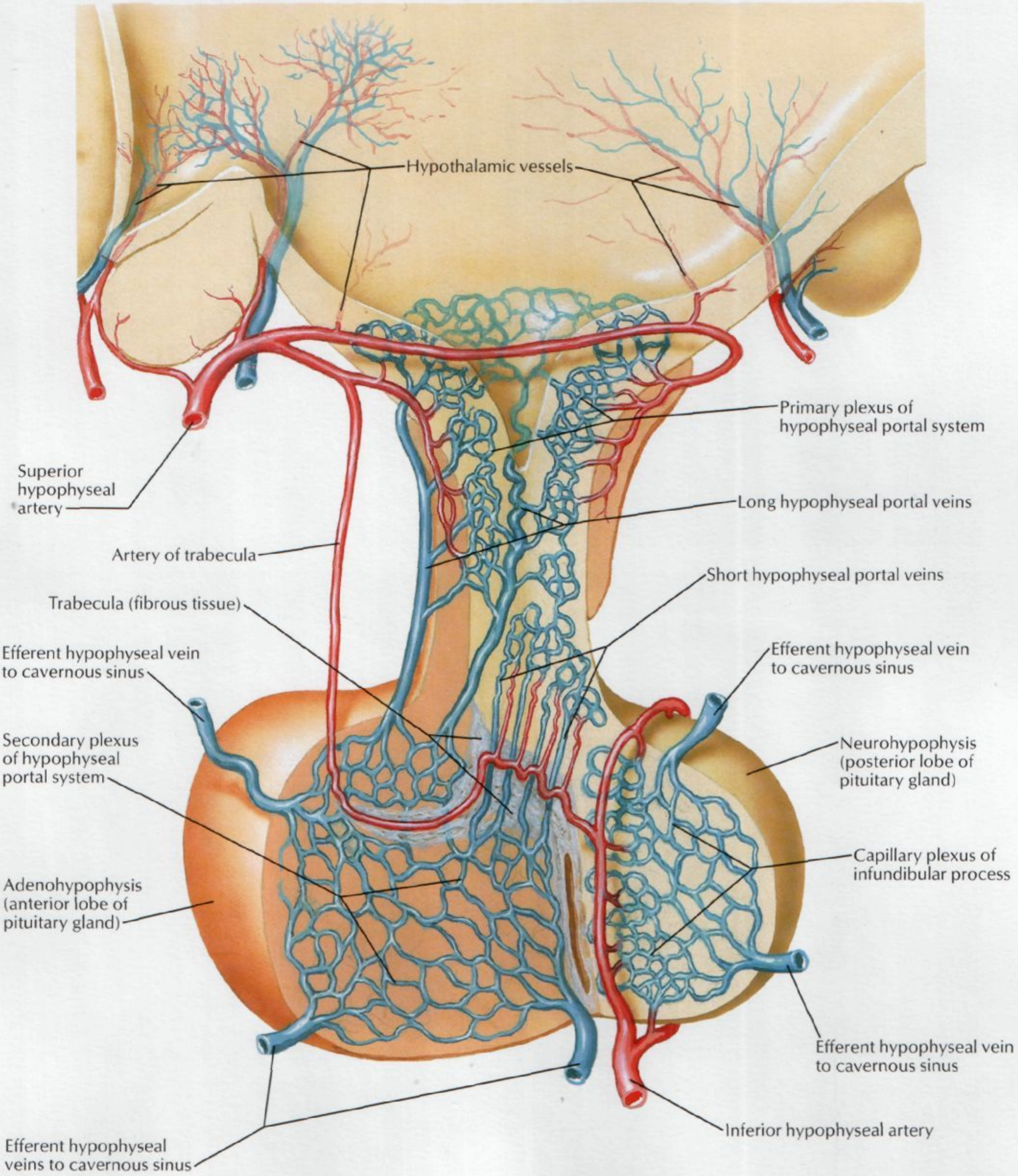
SEE ALSO PLATES 100, 101




Lamina terminalis
Paraventricular hypothalamic nucleus
Supraoptic hypothalamic nucleus
Supraopticohypophyseal tract
Tuberohypophyseal tract
Hypothalamohypophyseal tract
Infundibulum (pituitary stalk)
Hypothalamic sulcus
Mammillary body
Arcuate (infundibular) nucleus
Adenohypophysis (anterior lobe of pituitary gland)
Pars tuberalis
Fibrous trabecula
Pars intermedia
Pars distalis
Cleft
Median eminence of tuber cinereum
Infundibular stem
Infundibular process
Neurohypophysis (posterior lobe of pituitary gland)

Arteries and Veins of Hypothalamus and Hypophysis

SEE ALSO PLATE 133



Hypothalamic vessels
Primary plexus of hypophyseal portal system
Superior hypophyseal artery
Long hypophyseal portal veins
Artery of trabecula
Short hypophyseal portal veins
Trabecula (fibrous tissue)
Efferent hypophyseal vein to cavernous sinus
Efferent hypophyseal vein to cavernous sinus
Secondary plexus of hypophyseal portal system
Neurohypophysis (posterior lobe of pituitary gland)
Capillary plexus of infundibular process
Adenohypophysis (anterior lobe of pituitary gland)
Efferent hypophyseal vein to cavernous sinus
Inferior hypophyseal artery
Efferent hypophyseal veins to cavernous sinus

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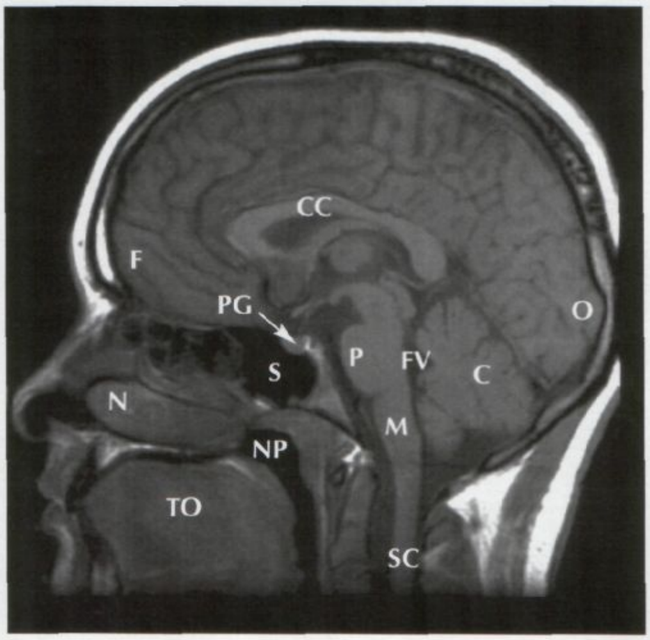
Head Scans: Sagittal MR Images

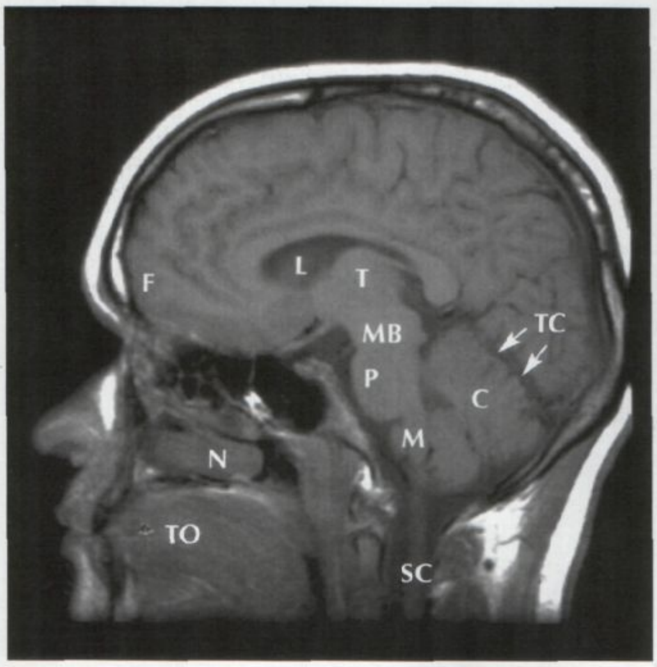
SEE ALSO PLATE 100

Median (A) and paramedian (B,C) sagittal MR images

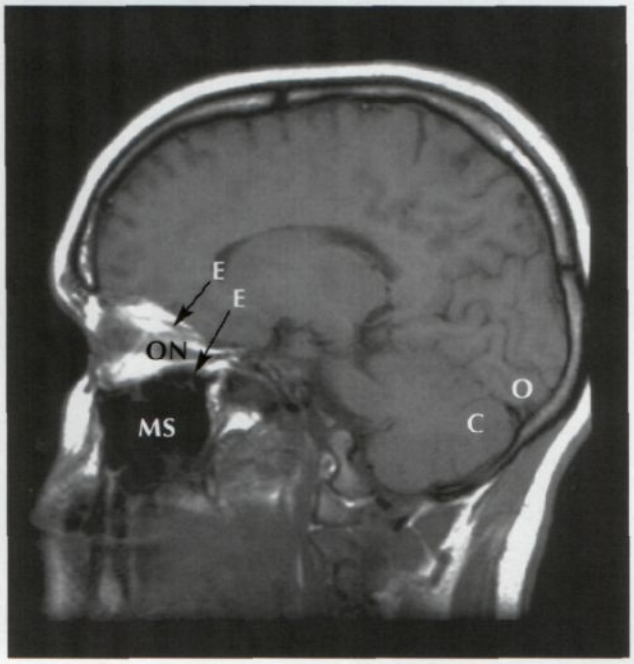
A



C	Cerebellum
CC	Corpus callosum
E	Extraocular muscles
F	Frontal pole
FV	Fourth ventricle
L	Lateral ventricle
M	Medulla oblongata
MB	Midbrain
MS	Maxillary sinus
N	Inferior nasal concha
NP	Nasopharynx
O	Occipital pole
ON	Optic nerve
P	Pons
PG	Pituitary gland
S	Sphenoid sinus
SC	Spinal cord
T	Thalamus
TC	Tentorium cerebelli
TO	Tongue



B



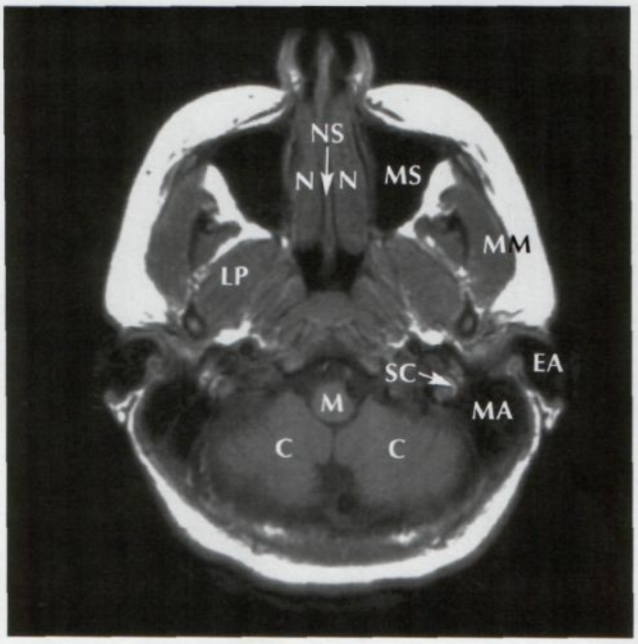
C

Head Scans: Axial CT Images

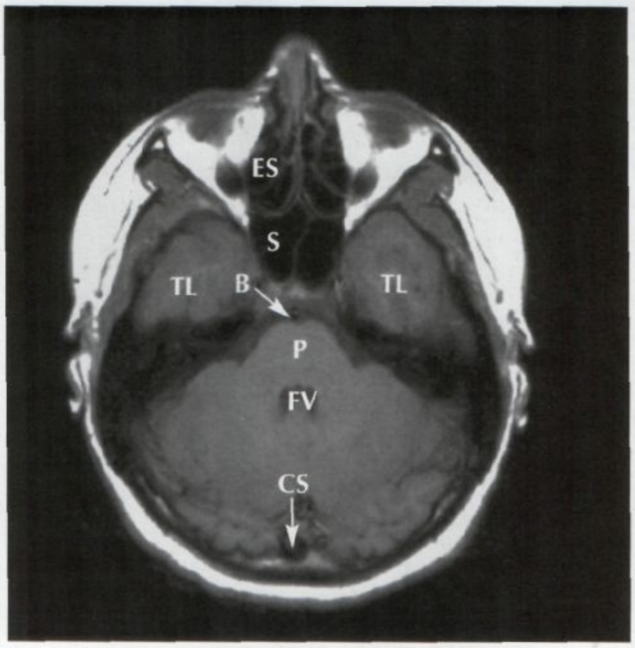
SEE ALSO PLATE 43

Axial CT images of the head from inferior (A) to superior (C)

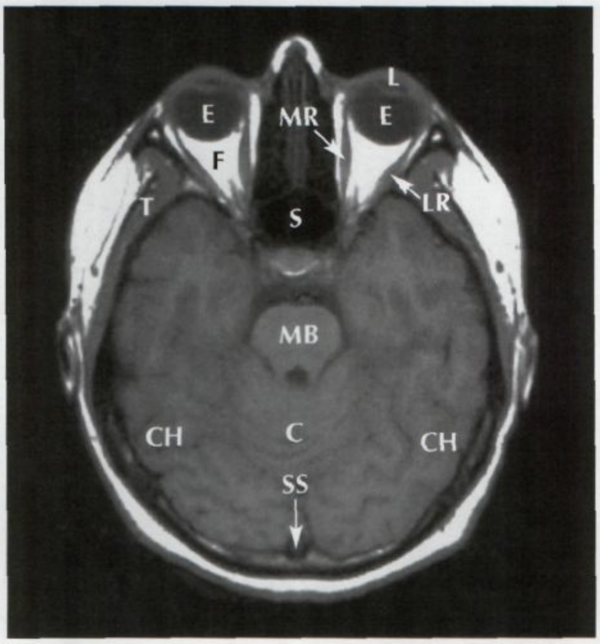
A



B	Basilar artery
C	Cerebellum
CH	Cerebral hemisphere
CS	Confluence of sinuses
E	Eye
EA	External acoustic meatus
ES	Ethmoid sinus
F	Fat in orbit
FV	Fourth ventricle
L	Lens
LP	Lateral pterygoid muscle
LR	Lateral rectus muscle
M	Medulla oblongata
MA	Mastoid air cells
MB	Midbrain
MM	Masseter muscle
MR	Medial rectus muscle
MS	Maxillary sinus
N	Nasal concha
NS	Nasal septum
P	Pons
S	Sphenoid sinus
SC	Semicircular canals
SS	Superior sagittal sinus
T	Temporalis muscle
TL	Temporal lobe



B



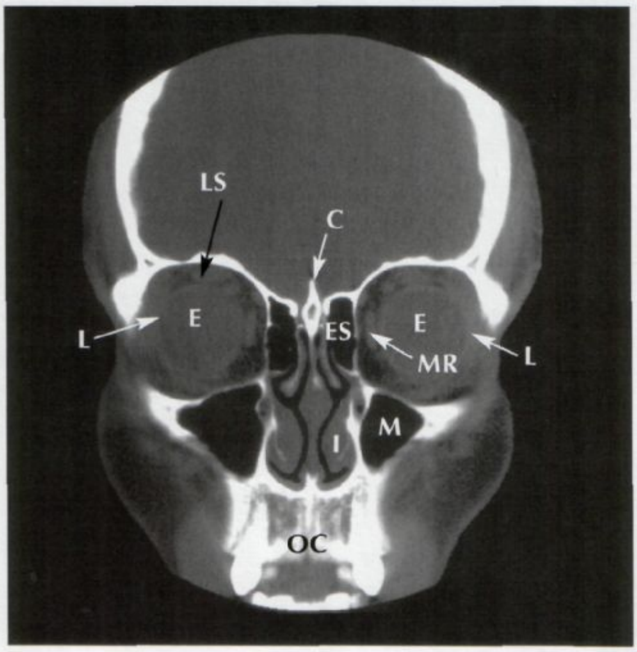
C

Head Scans: Coronal CT Images

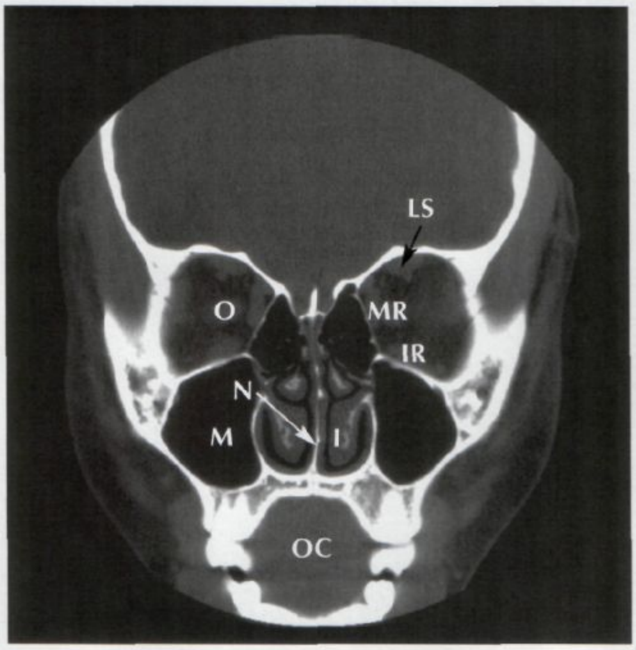
SEE ALSO PLATES 44, 79

Coronal CT images of the head from anterior (A) to posterior (C)

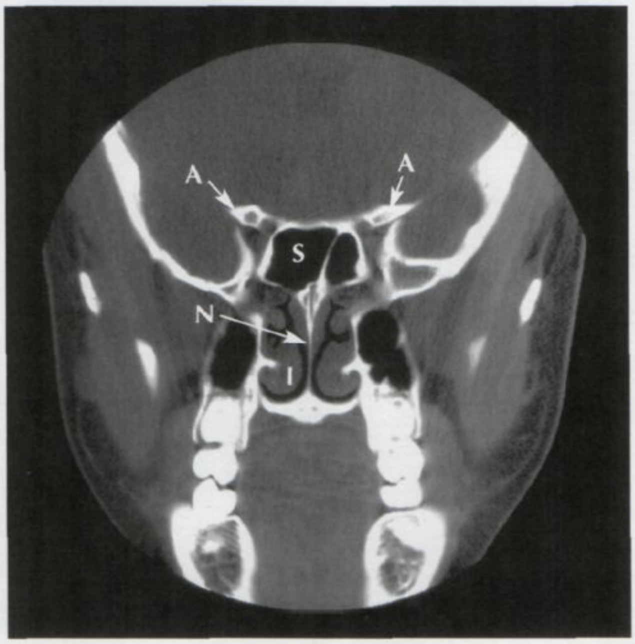
A



A	Anterior clinoid process
C	Crista galli
E	Eye (vitreous chamber)
ES	Ethmoid sinus
I	Inferior nasal concha
IR	Inferior rectus muscle
L	Lateral rectus muscle
LS	Levator palpebrae superioris and superior rectus muscles
M	Maxillary sinus
MR	Medial rectus muscle
N	Nasal septum
O	Optic nerve
OC	Oral cavity
S	Sphenoid sinus



B



C

Section II

BACK AND SPINAL CORD

SURFACE ANATOMY
Plate 145

145. Back

BONES AND LIGAMENTS
Plates 146–152

146. Vertebral Column
147. Thoracic Vertebrae
148. Lumbar Vertebrae
149. Lumbar Vertebrae: Radiographs
150. Sacrum and Coccyx
151. Vertebral Ligaments: Lumbar Region
152. Vertebral Ligaments: Lumbosacral Region

SPINAL CORD
Plates 153–166

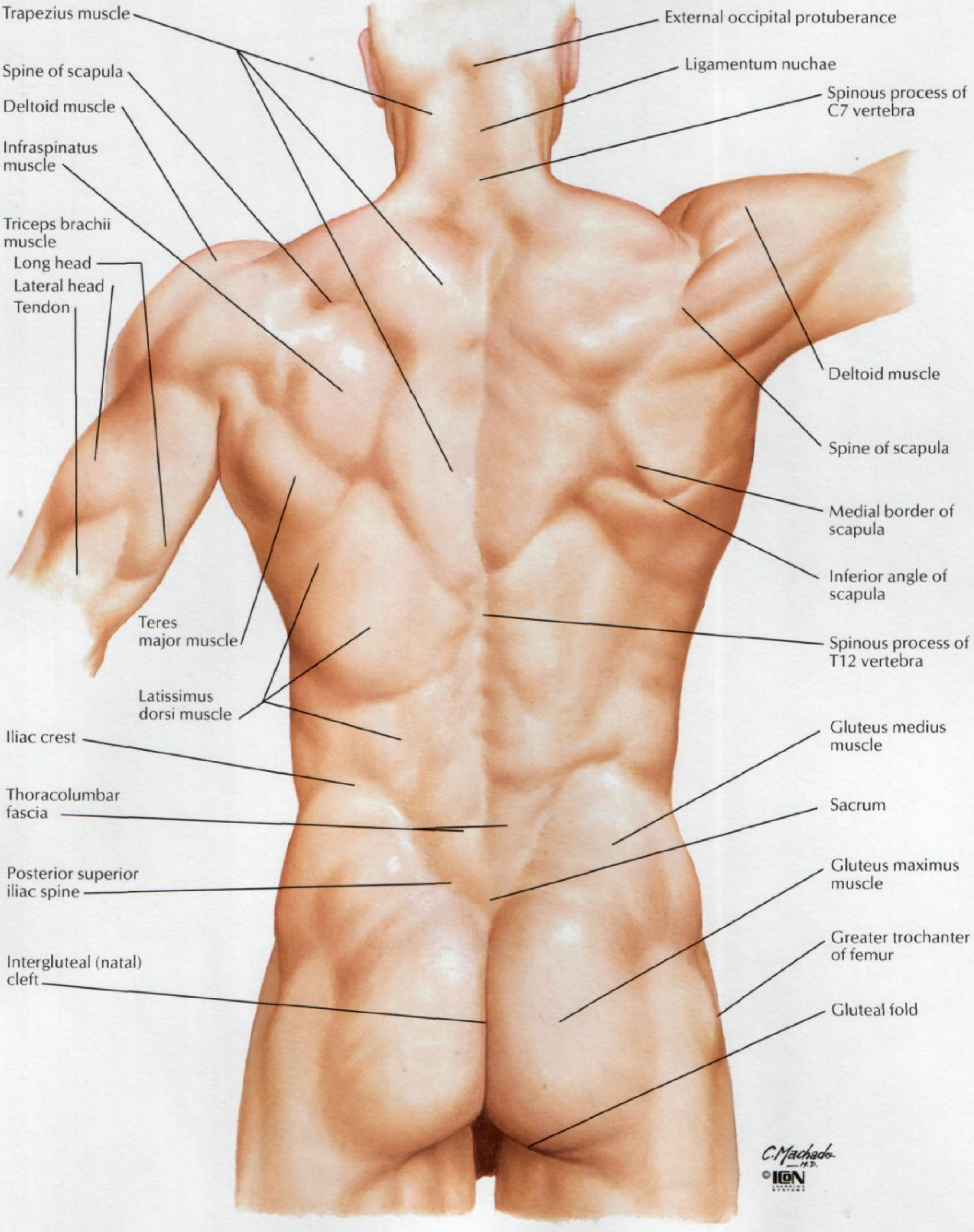
153. Spinal Cord and Ventral Rami In Situ
154. Relation of Spinal Nerve Roots to Vertebrae
155. Motor Impairment Related to Level of Spinal Cord Injury
156. Lumbar Disc Herniation: Clinical Manifestations
157. Dermatomes
158. Spinal Cord Cross Sections: Fiber Tracts
159. Autonomic Nervous System: General Topography
160. Autonomic Nervous System: Schema

161. Cholinergic and Adrenergic Synapses: Schema
162. Spinal Membranes and Nerve Roots
163. Spinal Nerve Origin: Cross Sections
164. Arteries of Spinal Cord: Schema
165. Arteries of Spinal Cord: Intrinsic Distribution
166. Veins of Spinal Cord and Vertebral Column

MUSCLES AND NERVES
Plates 167–173

167. Muscles of Back: Superficial Layers
168. Muscles of Back: Intermediate Layers
169. Muscles of Back: Deep Layers
170. Nerves of Back
171. Suboccipital Triangle
172. Lumbar Region of Back: Cross Section
173. Typical Thoracic Spinal Nerve

Back


Trapezius muscle
Spine of scapula
Deltoid muscle
Infraspinatus muscle
Triceps brachii muscle
Long head
Lateral head
Tendon
Teres major muscle
Latissimus dorsi muscle
Iliac crest
Thoracolumbar fascia
Posterior superior iliac spine
Intergluteal (natal) cleft
External occipital protuberance
Ligamentum nuchae
Spinous process of C7 vertebra
Deltoid muscle
Spine of scapula
Medial border of scapula
Inferior angle of scapula
Spinous process of T12 vertebra
Gluteus medius muscle
Sacrum
Gluteus maximus muscle
Greater trochanter of femur
Gluteal fold
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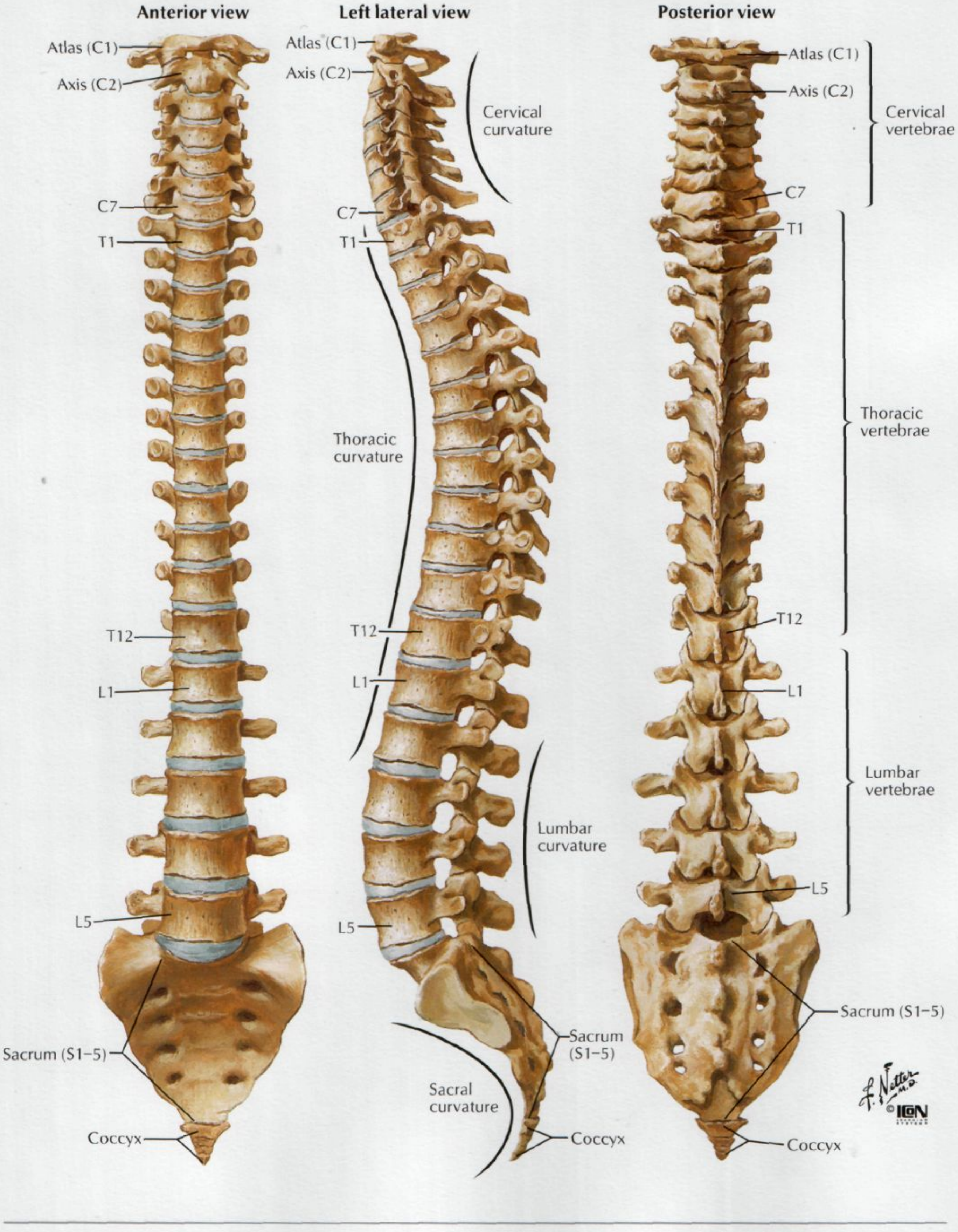
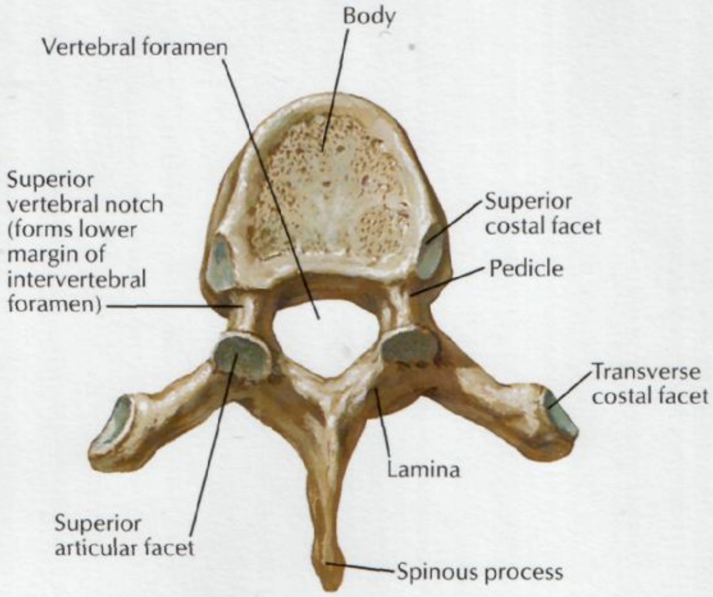
Vertebral Column

SEE ALSO PLATES 12, 15, 16, 147, 148, 150, 178, 240

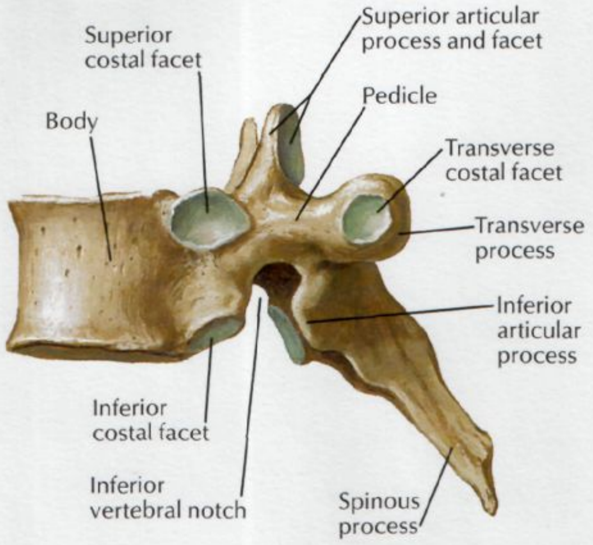


Thoracic Vertebrae

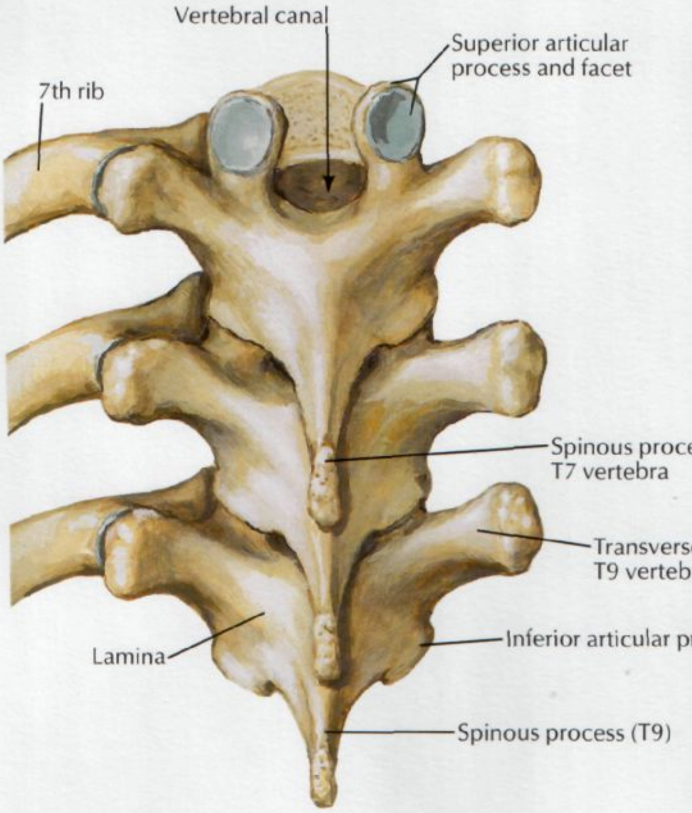
SEE ALSO PLATE 180



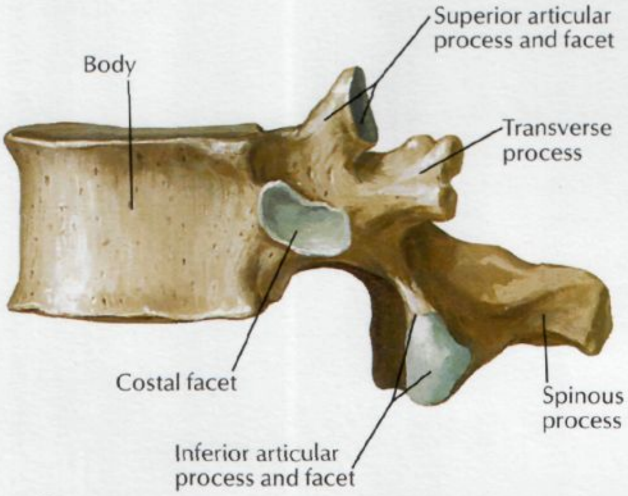
T6 vertebra: superior view



T6 vertebra: lateral view


Vertebral canal
Superior articular process and facet
7th rib
Spinous process of T7 vertebra
Transverse process of T9 vertebra
Lamina
Inferior articular process (T9)
Spinous process (T9)

T7, T8 and T9 vertebrae: posterior view


Body
Superior articular process and facet
Transverse process
Costal facet
Spinous process
Inferior articular process and facet

T12 vertebra: lateral view

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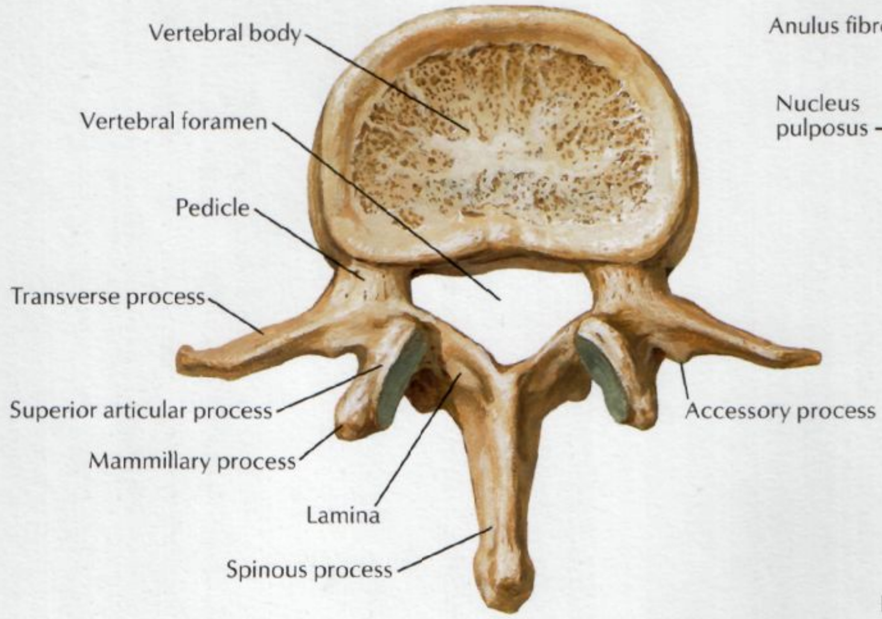
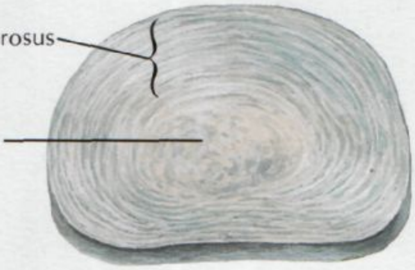
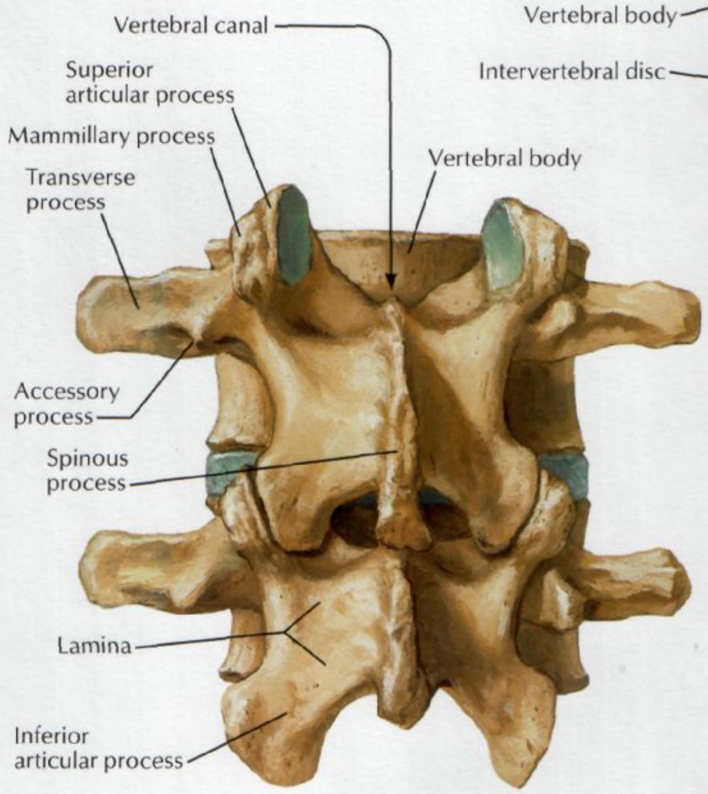
Lumbar Vertebrae



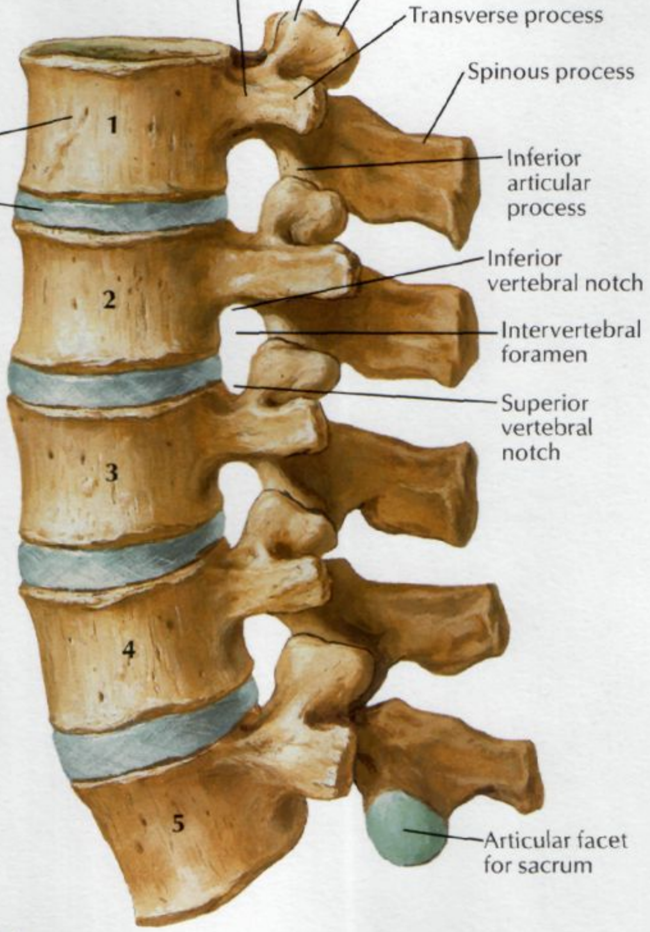
L2 vertebra: superior view



Intervertebral disc



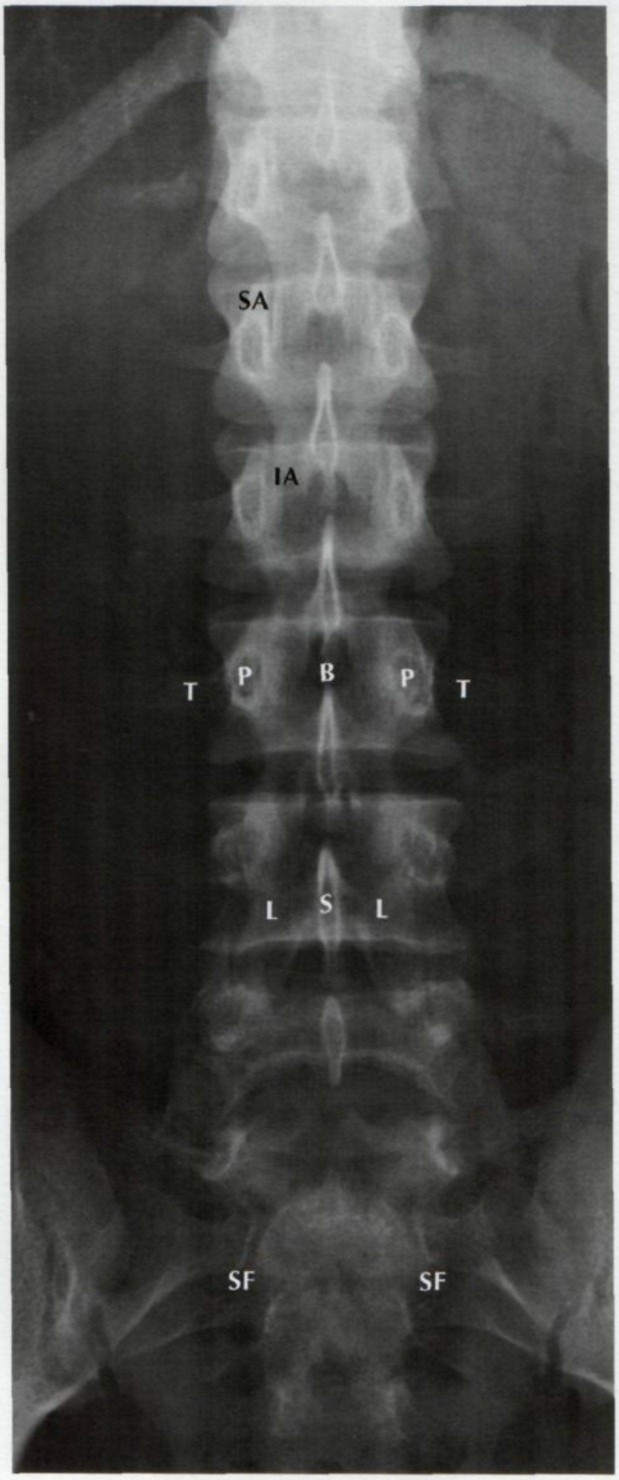
L3 and L4 vertebrae: posterior view



Lumbar vertebrae, assembled: left lateral view

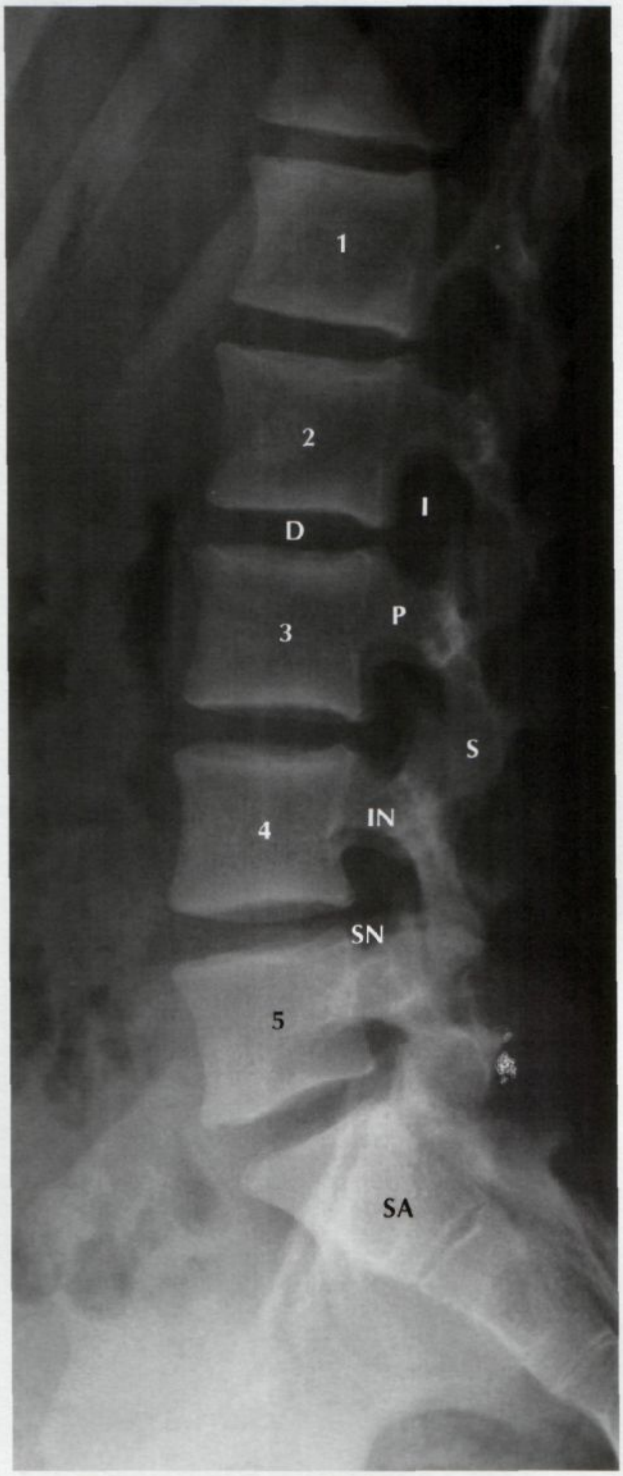
Lumbar Vertebrae: Radiographs

Anteroposterior radiograph



B	Body of L3 vertebra
IA	Inferior articular process of L1 vertebra
L	Lamina of L4 vertebra
P	Pedicle of L3 vertebra
S	Spinous process of L4 vertebra
SA	Superior articular process of L1 vertebra
SF	Sacral foramen
T	Transverse process of L3 vertebra

Lateral radiograph

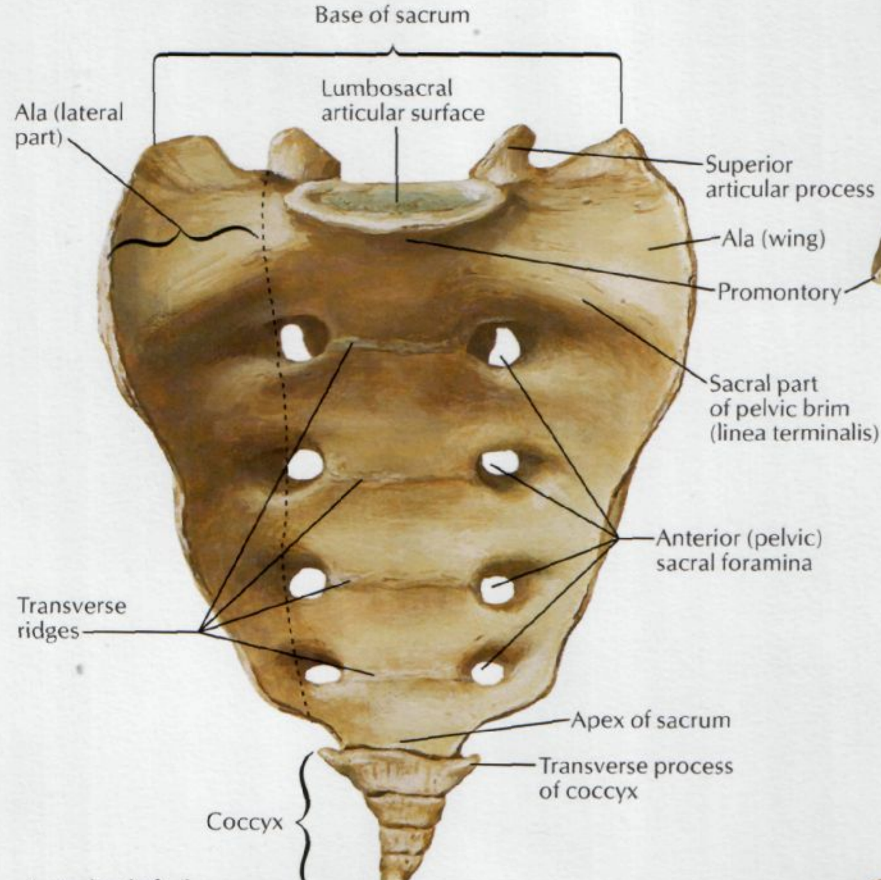


D	Intervertebral disc space
I	Intervertebral foramen
IN	Inferior vertebral notch of L4 vertebra
P	Pedicle of L3 vertebra
S	Spinous process of L3 vertebra
SA	Sacrum
SN	Superior vertebral notch of L5 vertebra

Note: The lumbar vertebral bodies are numbered

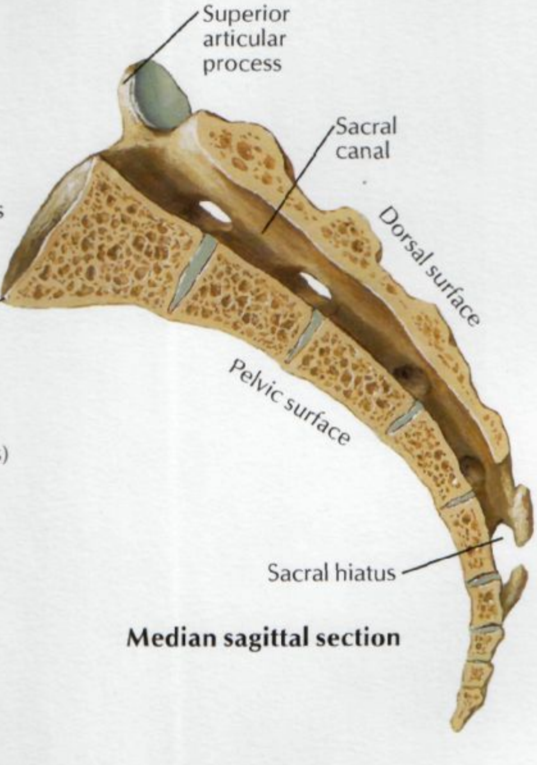
Sacrum and Coccyx

SEE ALSO PLATES 146, 152, 240, 340–342

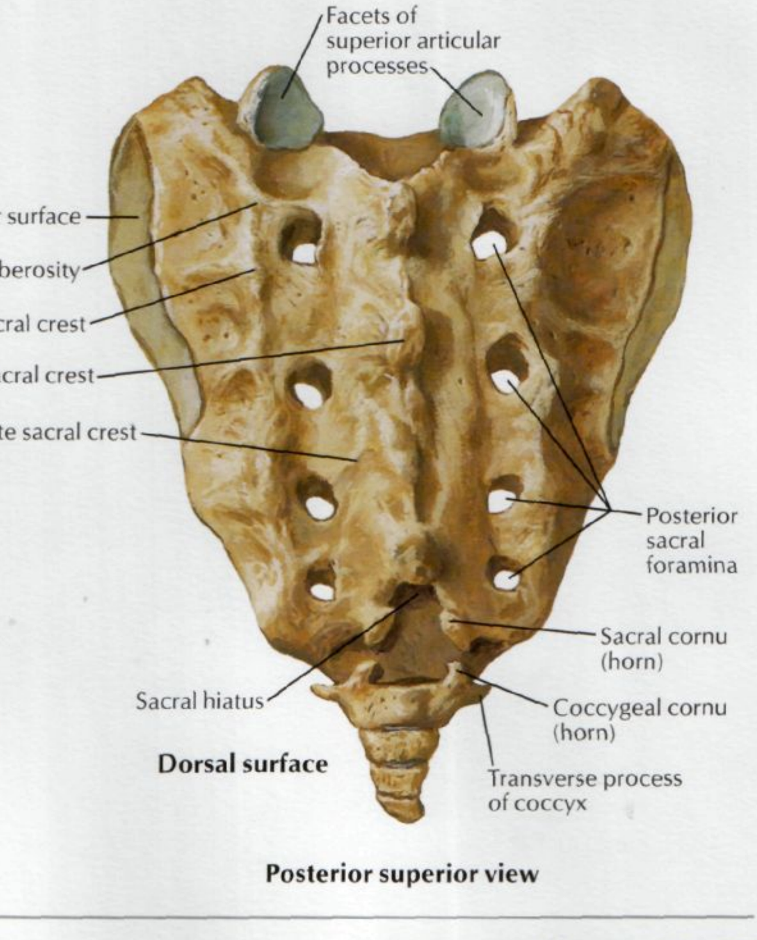

Base of sacrum
Ala (lateral part)
Lumbosacral articular surface
Superior articular process
Ala (wing)
Promontory
Sacral part of pelvic brim (linea terminalis)
Anterior (pelvic) sacral foramina
Transverse ridges
Apex of sacrum
Transverse process of coccyx
Coccyx

Anterior inferior view

Pelvic surface

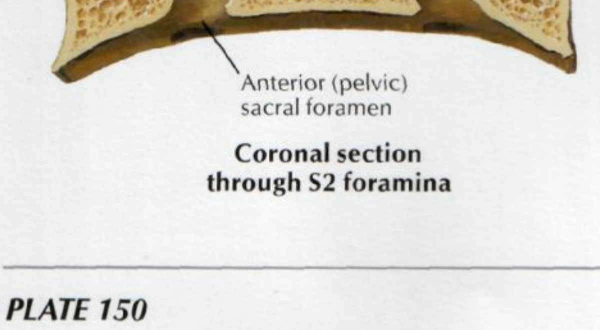


Median sagittal section



Dorsal surface

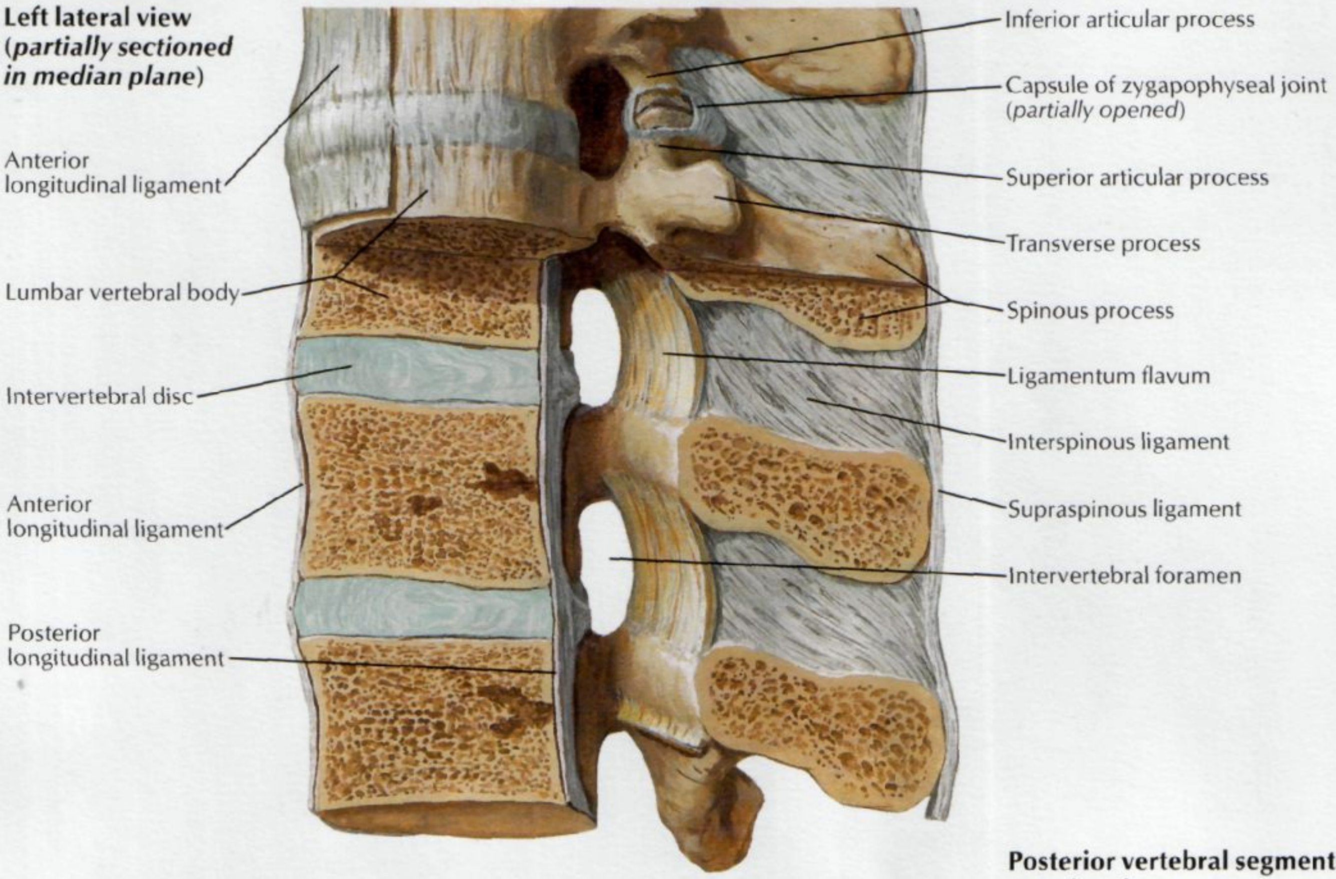
Posterior superior view



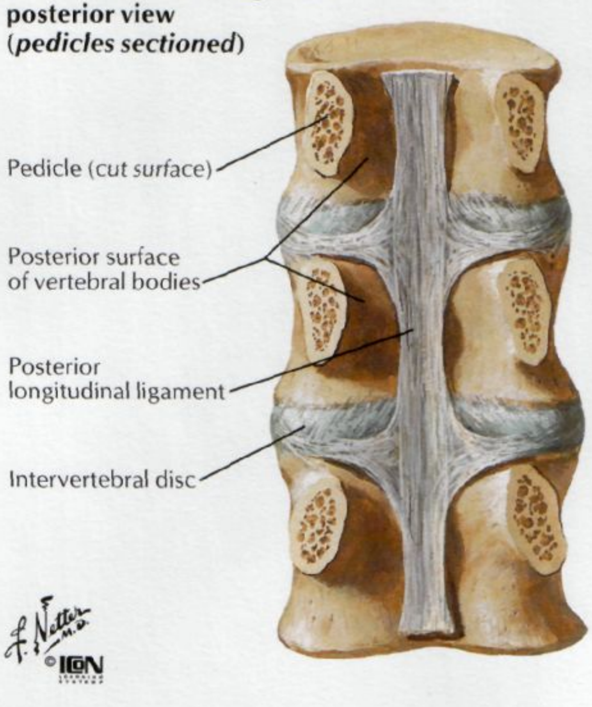
Coronal section through S2 foramina

Vertebral Ligaments: Lumbar Region

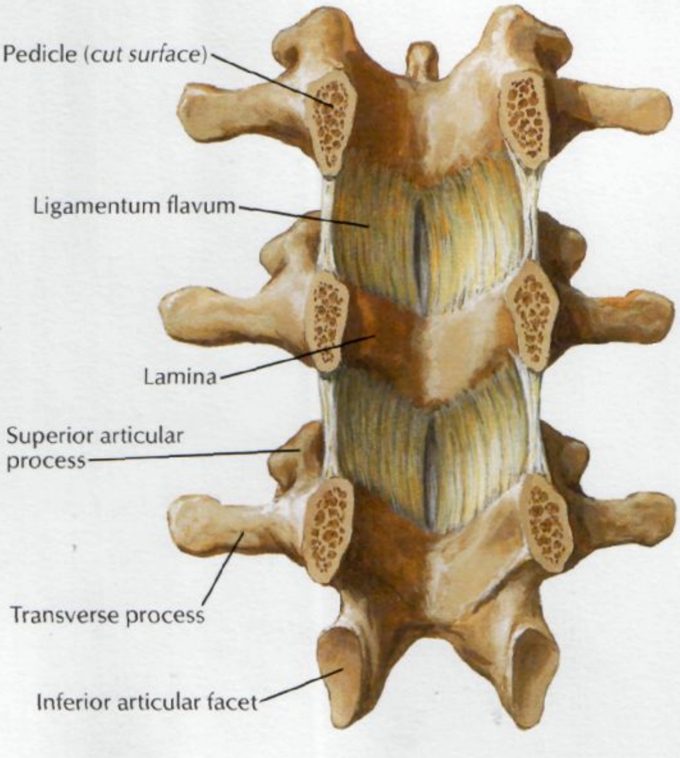
Left lateral view (*partially sectioned in median plane*)


Anterior longitudinal ligament
Lumbar vertebral body
Intervertebral disc
Anterior longitudinal ligament
Posterior longitudinal ligament
Inferior articular process
Capsule of zygapophyseal joint (*partially opened*)
Superior articular process
Transverse process
Spinous process
Ligamentum flavum
Interspinous ligament
Supraspinous ligament
Intervertebral foramen

Anterior vertebral segments: posterior view (*pedicles sectioned*)


Pedicle (*cut surface*)
Posterior surface of vertebral bodies
Posterior longitudinal ligament
Intervertebral disc

Posterior vertebral segments: anterior view



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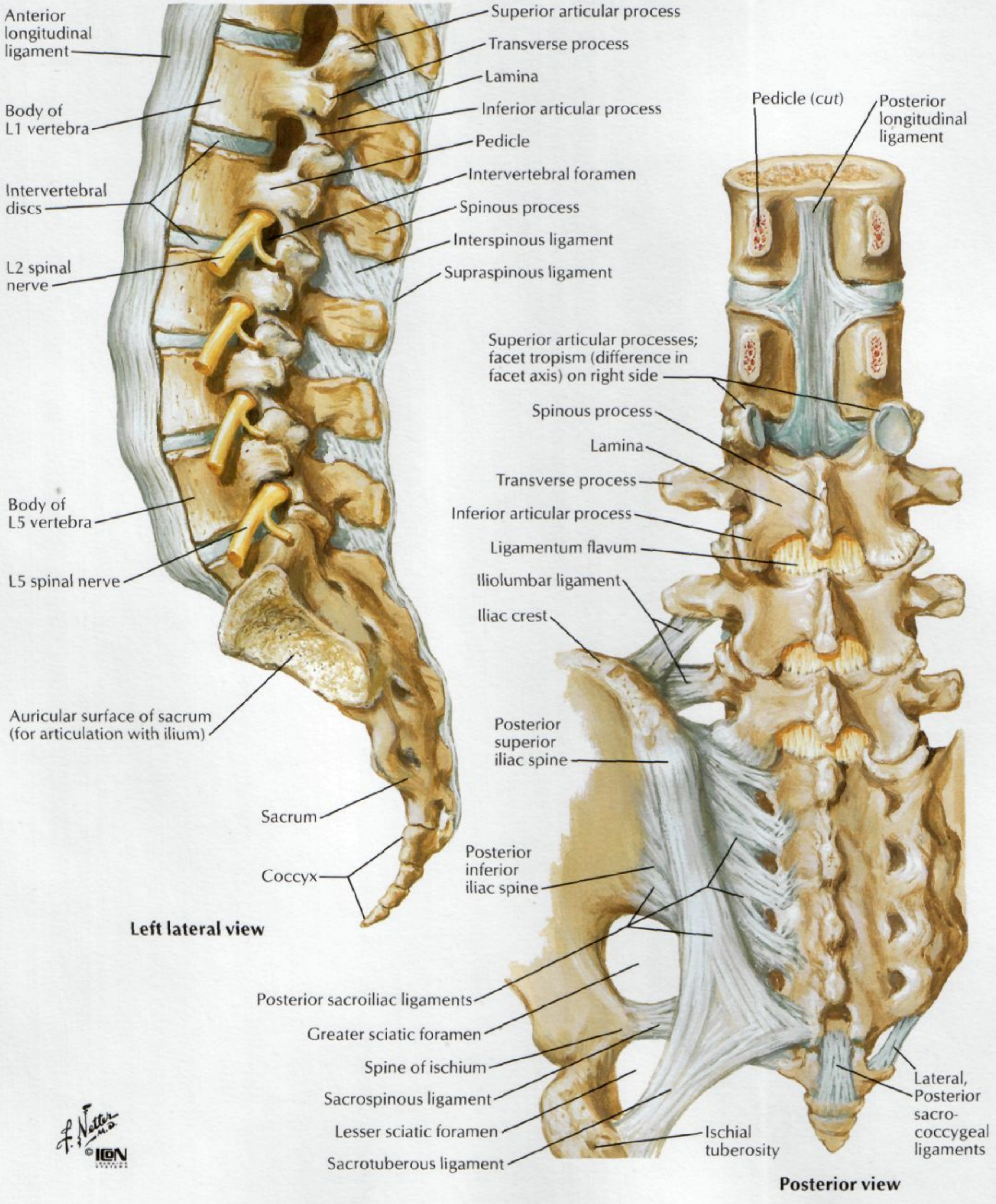
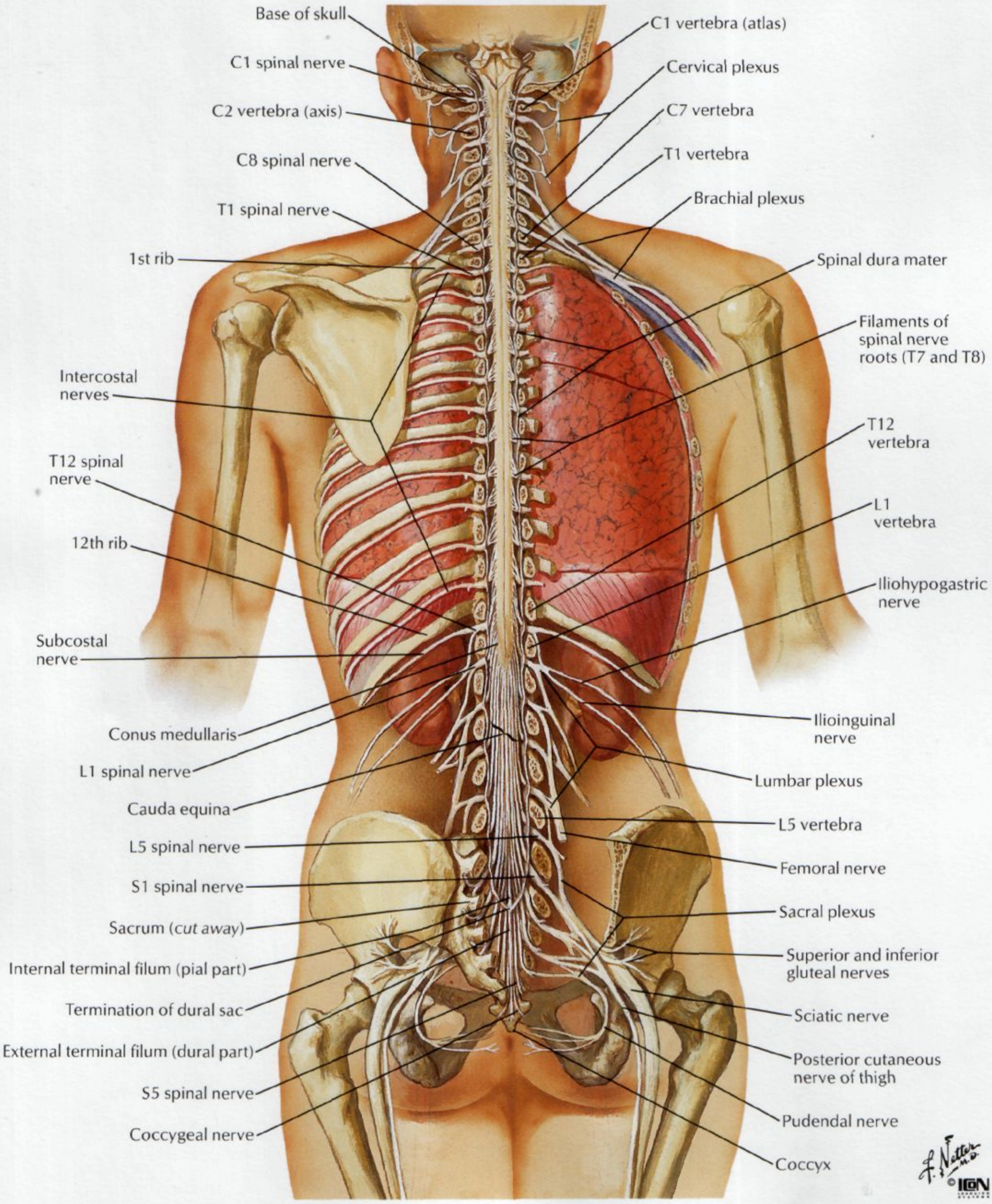
Vertebral Ligaments: Lumbosacral Region



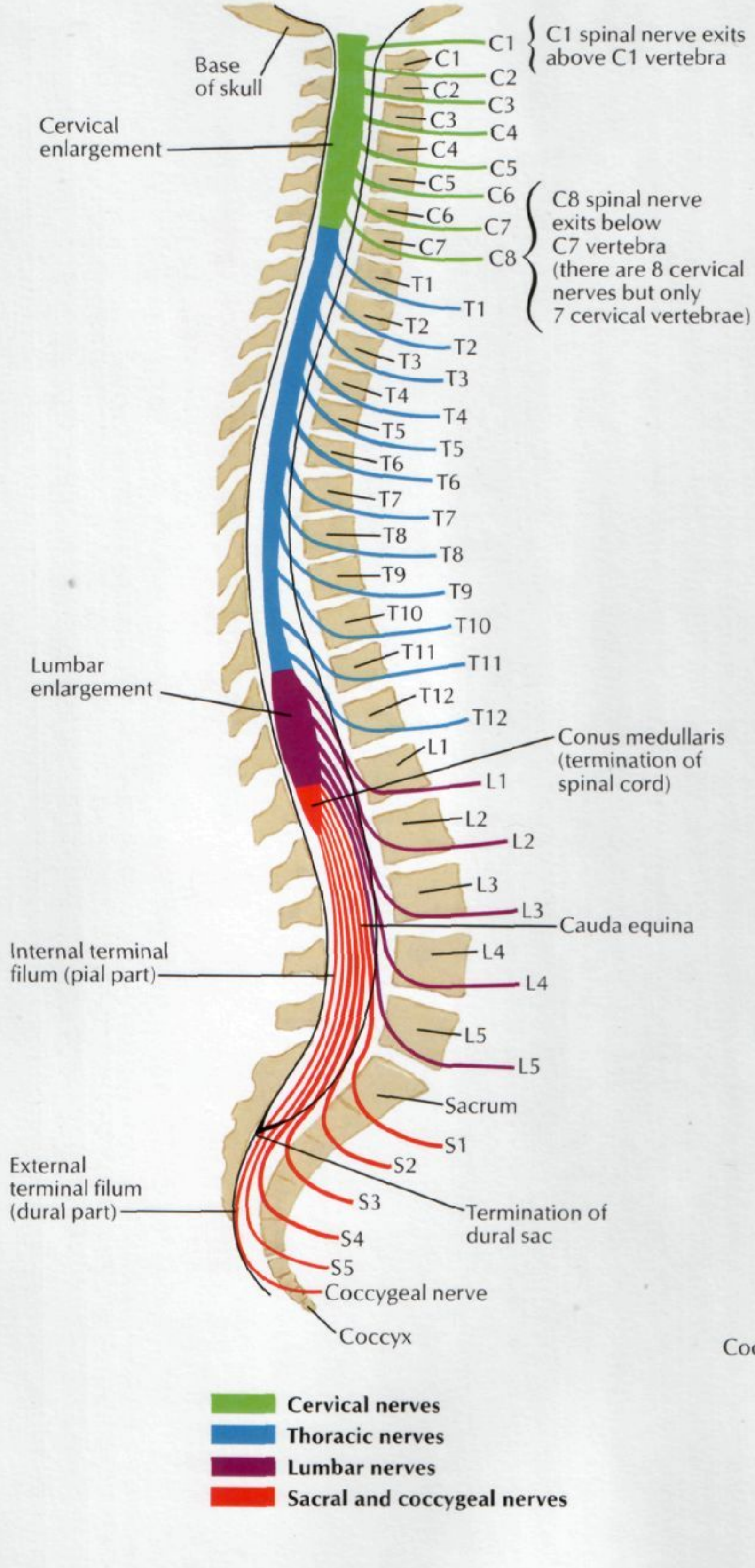
Left lateral view

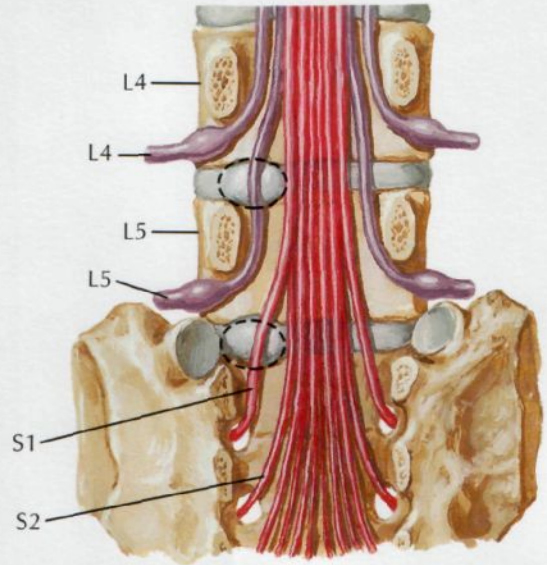
Posterior view

Spinal Cord and Ventral Rami In Situ

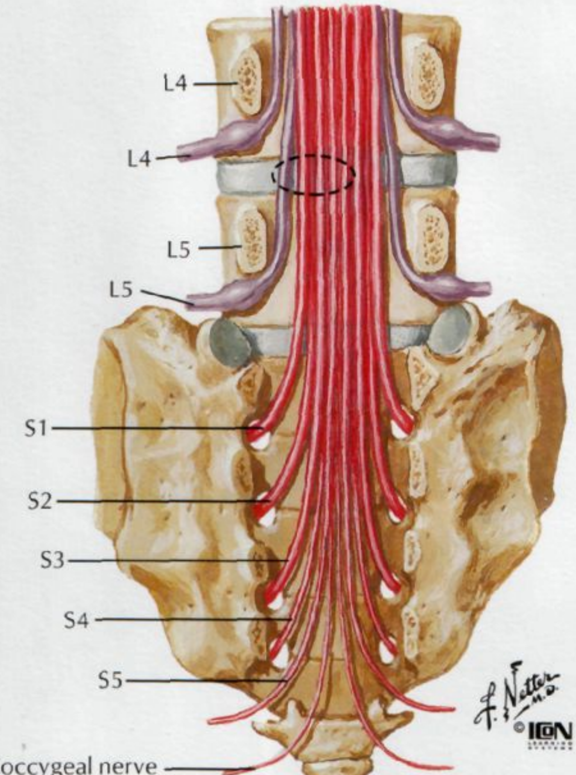


Relation of Spinal Nerve Roots to Vertebrae


Base of skull
Cervical enlargement
C1
C1
C2
C2
C3
C3
C4
C4
C5
C5
C6
C6
C7
C7
C8
C1 spinal nerve exits above C1 vertebra
C8 spinal nerve exits below C7 vertebra (there are 8 cervical nerves but only 7 cervical vertebrae)
T1
T1
T2
T2
T3
T3
T4
T4
T5
T5
T6
T6
T7
T7
T8
T8
T9
T9
T10
T10
T11
T11
T12
T12
Lumbar enlargement
Conus medullaris (termination of spinal cord)
L1
L1
L2
L2
L3
L3
Cauda equina
Internal terminal filum (pial part)
L4
L4
L5
L5
Sacrum
S1
S2
External terminal filum (dural part)
S3
Termination of dural sac
S4
S5
Coccygeal nerve
Coccyx
🟩 Cervical nerves
🟦 Thoracic nerves
🟪 Lumbar nerves
🟥 Sacral and coccygeal nerves

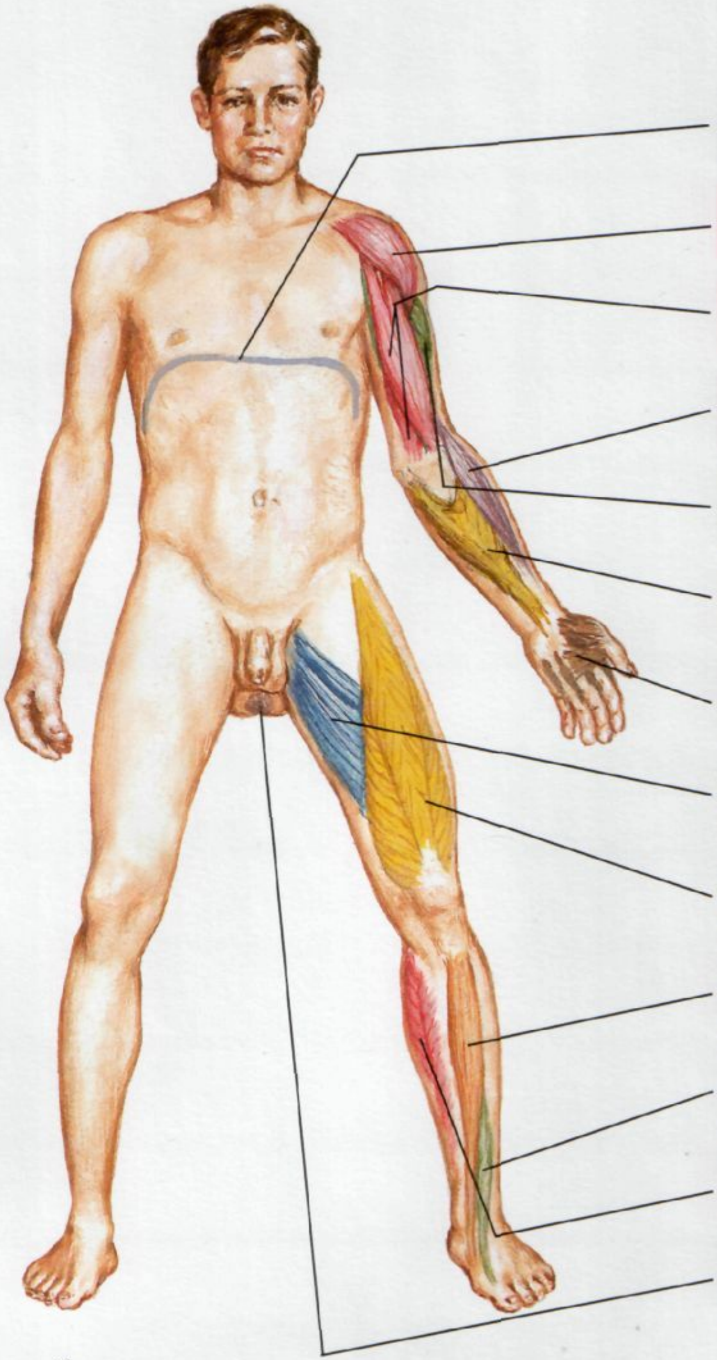


Lumbar disc protrusion does not usually affect nerve exiting above disc. Lateral protrusion at disc level L4–5 affects L5 spinal nerve, not L4 spinal nerve. Protrusion at disc level L5–S1 affects S1 spinal nerve, not L5 spinal nerve



Medial protrusion at disc level L4–5 rarely affects L4 spinal nerve but may affect L5 spinal nerve and sometimes S1–4 spinal nerves

Motor Impairment Related to Level of Spinal Cord Injury



Function	Muscles	Segments
Inspiration	Diaphragm	C3,4, 5
Shoulder abduction	Deltoid	C5
Elbow flexion	Biceps brachii Brachialis	C5, 6
Wrist extension	Extensor carpi radialis longus and brevis	C6, 7
Elbow extension	Triceps brachii	C7, 8
Finger flexion	Flexor digitorum superficialis and profundus	C8
Finger abduction and adduction	Interossei	C8, T1
Thigh adduction	Adductor longus and brevis	L2, 3
Knee extension	Quadriceps	L3, 4
Ankle dorsiflexion	Tibialis anterior	L4, 5
Great toe extension	Extensor hallucis longus	L5, S1
Ankle plantar flexion	Gastrocnemius Soleus	S1, 2
Anal contraction	Sphincter ani externus	S2, 3, 4

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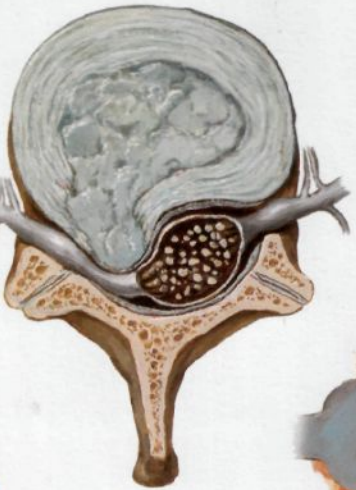
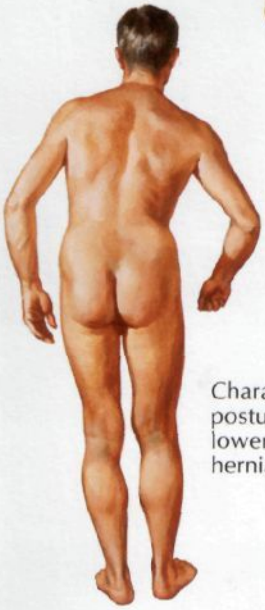
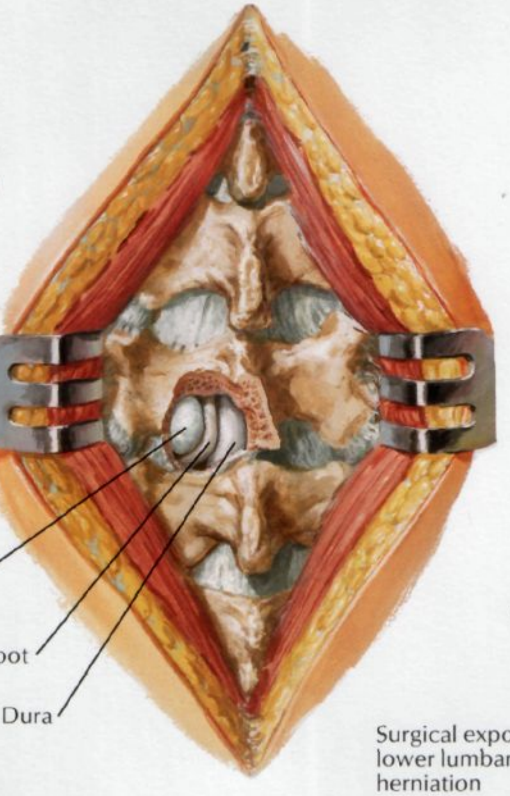
Lumbar Disc Herniation: Clinical Manifestations

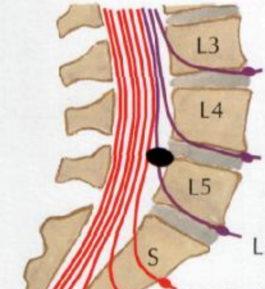
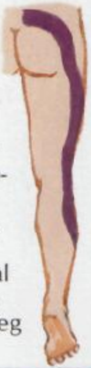
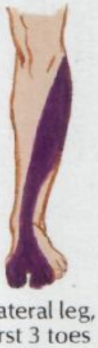
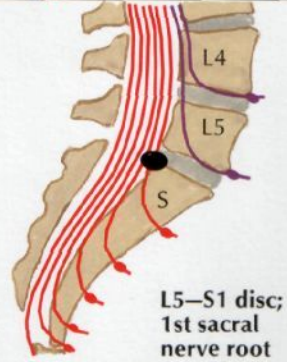
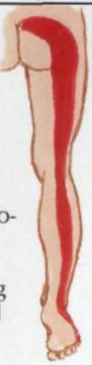
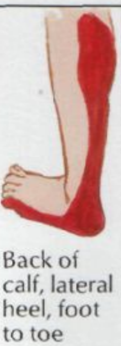

Schematic cross section showing compression of nerve root


Characteristic posture in left-sided lower lumbar disc herniation



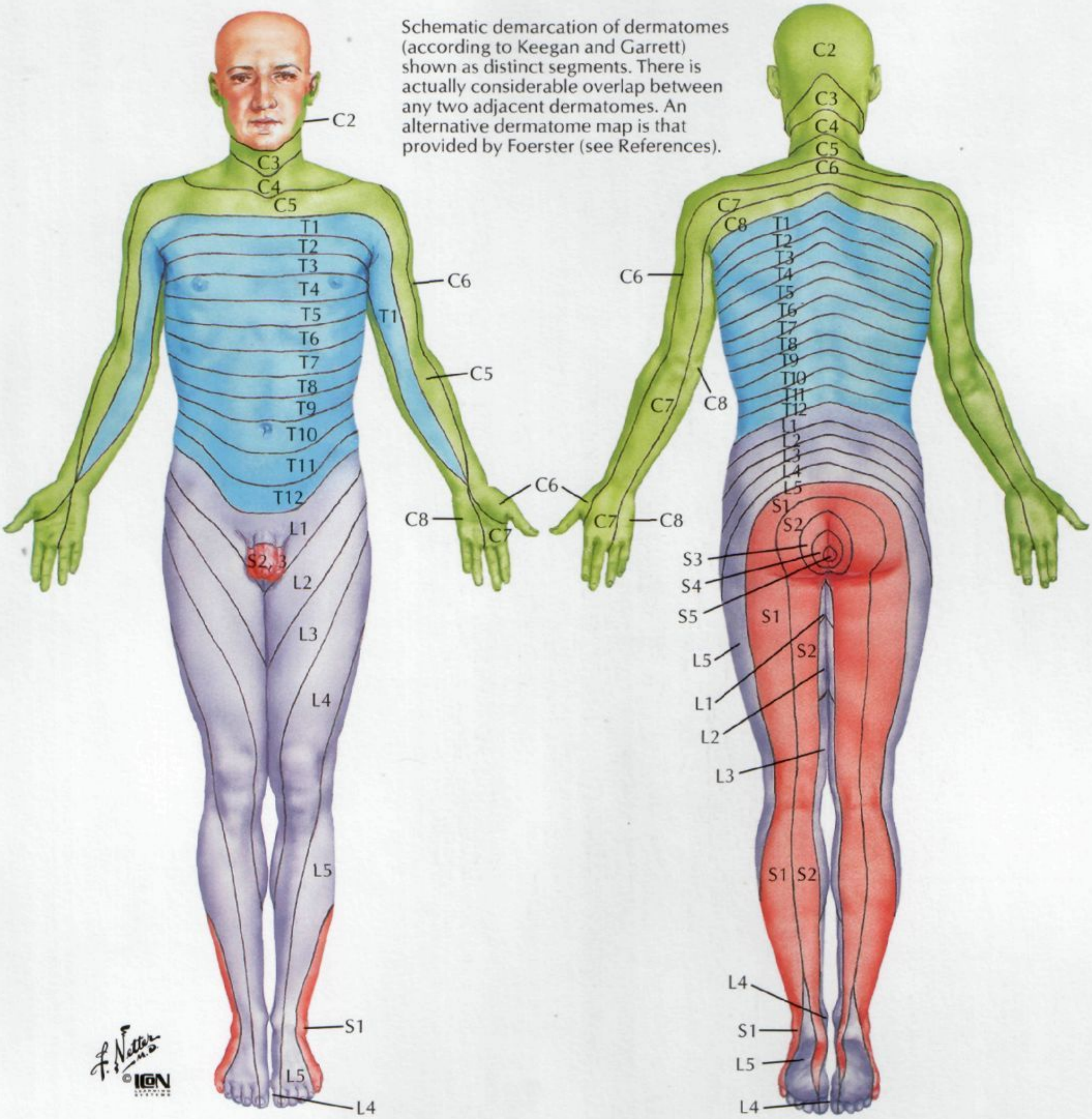
Surgical exposure of lower lumbar disc herniation

Clinical features of herniated lumbar nucleus pulposus

Level of herniation	Pain	Numbness	Weakness	Atrophy	Reflexes
 **L4–5 disc; 5th lumbar nerve root**	Over sacro-iliac joint, hip, lateral thigh and leg 	 Lateral leg, first 3 toes	 Dorsiflexion of great toe and foot; difficulty walking on heels; foot drop may occur	Minor	Changes uncommon in knee and ankle jerks, but internal hamstring reflex diminished or absent
 **L5–S1 disc; 1st sacral nerve root**	Over sacro-iliac joint, hip, postero-lateral thigh and leg to heel 	 Back of calf, lateral heel, foot to toe	Plantar flexion of foot and great toe may be affected; difficulty walking on toes	 Gastrocnemius and soleus	 Ankle jerk diminished or absent

Dermatomes

SEE ALSO PLATES 465, 525; FOR MAPS OF CUTANEOUS NERVES SEE PLATES 20, 455, 457–459, 461, 464, 520–524



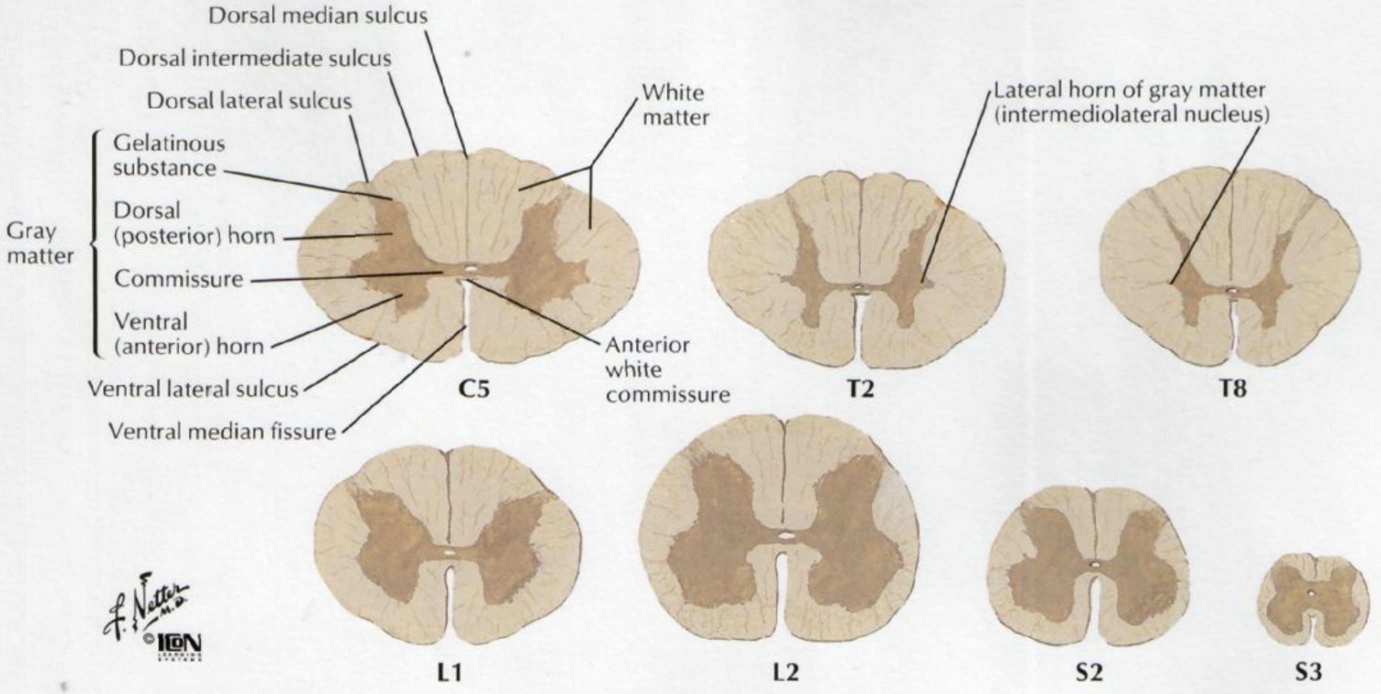
Schematic demarcation of dermatomes (according to Keegan and Garrett) shown as distinct segments. There is actually considerable overlap between any two adjacent dermatomes. An alternative dermatome map is that provided by Foerster (see References).

Levels of principal dermatomes

C5	Clavicles
C5, 6, 7	Lateral parts of upper limbs
C8, T1	Medial sides of upper limbs
C6	Thumb
C6, 7, 8	Hand
C8	Ring and little fingers
T4	Level of nipples
T10	Level of umbilicus
T12	Inguinal or groin regions
L1, 2, 3, 4	Anterior and inner surfaces of lower limbs
L4, 5, S1	Foot
L4	Medial side of great toe
S1, 2, L5	Posterior and outer surfaces of lower limbs
S1	Lateral margin of foot and little toe
S2, 3, 4	Perineum

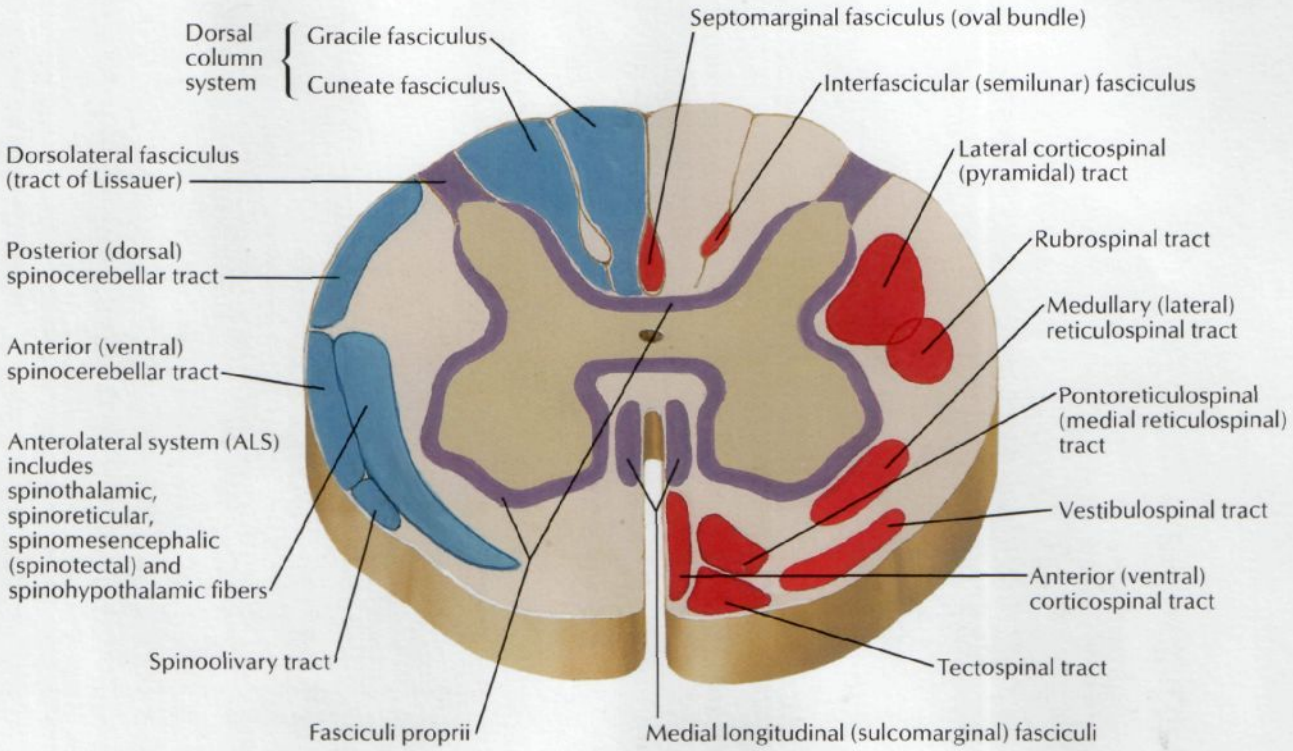
Spinal Cord Cross Sections: Fiber Tracts

Sections through spinal cord at various levels

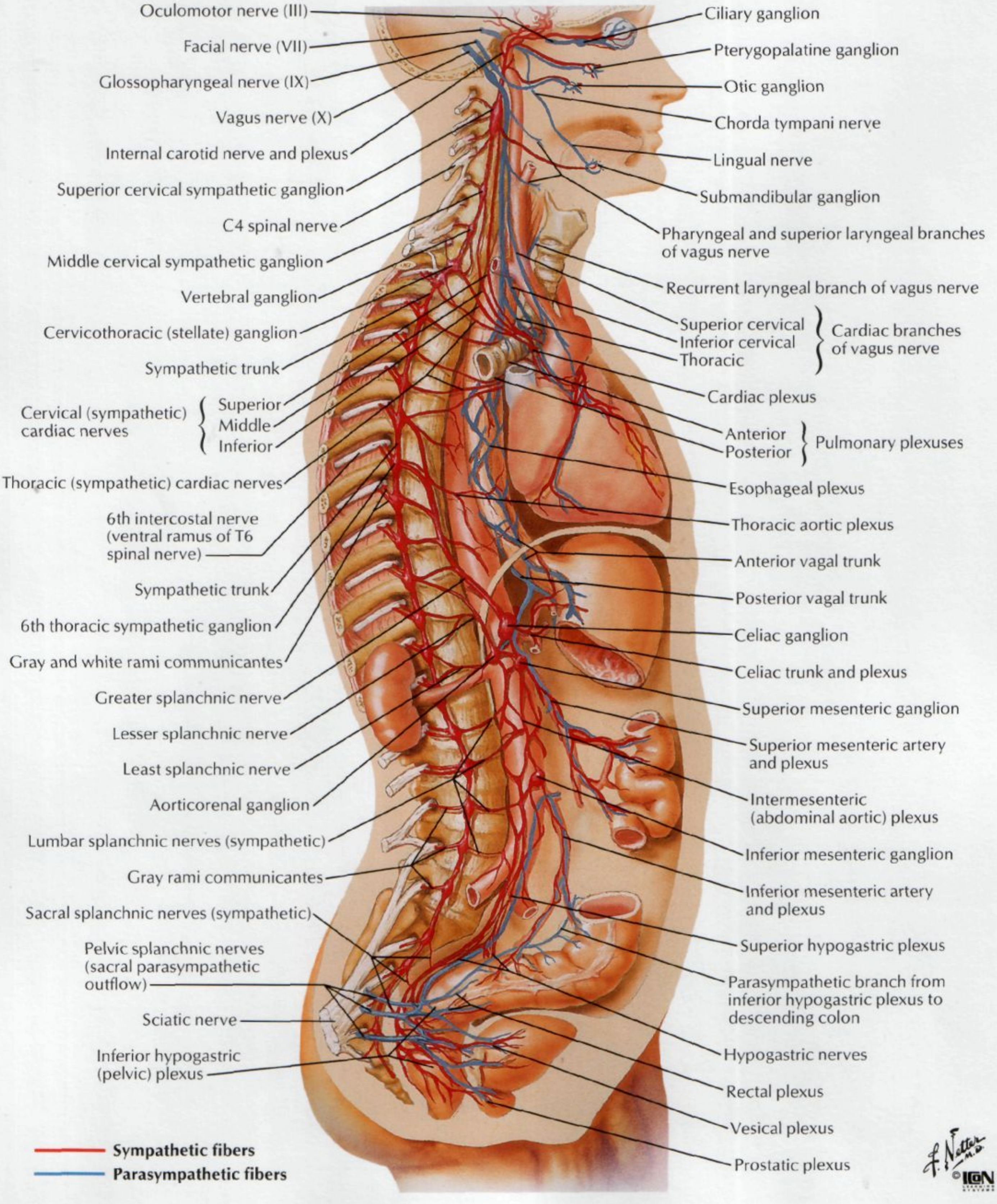


Principal fiber tracts of spinal cord

🟦 **Ascending pathways**
🟥 **Descending pathways**
▨ **Fibers passing in both directions**


Dorsal column system
Gracile fasciculus
Cuneate fasciculus
Septomarginal fasciculus (oval bundle)
Interfascicular (semilunar) fasciculus
Dorsolateral fasciculus (tract of Lissauer)
Lateral corticospinal (pyramidal) tract
Rubrospinal tract
Posterior (dorsal) spinocerebellar tract
Medullary (lateral) reticulospinal tract
Anterior (ventral) spinocerebellar tract
Pontoreticulospinal (medial reticulospinal) tract
Anterolateral system (ALS) includes spinothalamic, spinoreticular, spinomesencephalic (spinotectal) and spinohypothalamic fibers
Vestibulospinal tract
Anterior (ventral) corticospinal tract
Spinoolivary tract
Tectospinal tract
Fasciculi proprii
Medial longitudinal (sulcomarginal) fasciculi

Autonomic Nervous System: General Topography


Oculomotor nerve (III)
Facial nerve (VII)
Glossopharyngeal nerve (IX)
Vagus nerve (X)
Internal carotid nerve and plexus
Superior cervical sympathetic ganglion
C4 spinal nerve
Middle cervical sympathetic ganglion
Vertebral ganglion
Cervicothoracic (stellate) ganglion
Sympathetic trunk
Cervical (sympathetic) cardiac nerves
Superior
Middle
Inferior
Thoracic (sympathetic) cardiac nerves
6th intercostal nerve (ventral ramus of T6 spinal nerve)
Sympathetic trunk
6th thoracic sympathetic ganglion
Gray and white rami communicantes
Greater splanchnic nerve
Lesser splanchnic nerve
Least splanchnic nerve
Aorticorenal ganglion
Lumbar splanchnic nerves (sympathetic)
Gray rami communicantes
Sacral splanchnic nerves (sympathetic)
Pelvic splanchnic nerves (sacral parasympathetic outflow)
Sciatic nerve
Inferior hypogastric (pelvic) plexus
Ciliary ganglion
Pterygopalatine ganglion
Otic ganglion
Chorda tympani nerve
Lingual nerve
Submandibular ganglion
Pharyngeal and superior laryngeal branches of vagus nerve
Recurrent laryngeal branch of vagus nerve
Superior cervical
Inferior cervical
Thoracic
Cardiac branches of vagus nerve
Cardiac plexus
Anterior
Posterior
Pulmonary plexuses
Esophageal plexus
Thoracic aortic plexus
Anterior vagal trunk
Posterior vagal trunk
Celiac ganglion
Celiac trunk and plexus
Superior mesenteric ganglion
Superior mesenteric artery and plexus
Intermesenteric (abdominal aortic) plexus
Inferior mesenteric ganglion
Inferior mesenteric artery and plexus
Superior hypogastric plexus
Parasympathetic branch from inferior hypogastric plexus to descending colon
Hypogastric nerves
Rectal plexus
Vesical plexus
Prostatic plexus
Sympathetic fibers
Parasympathetic fibers
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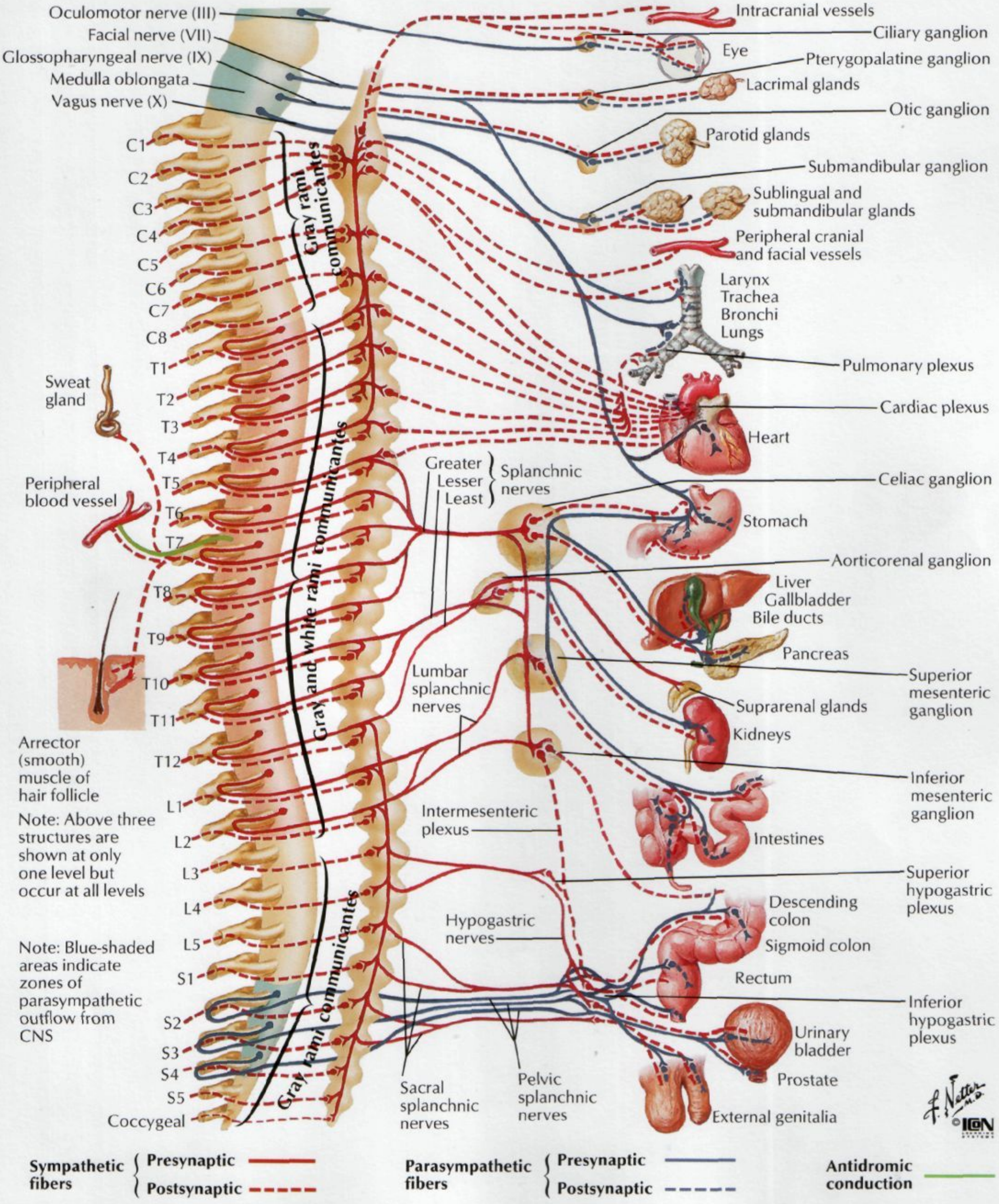
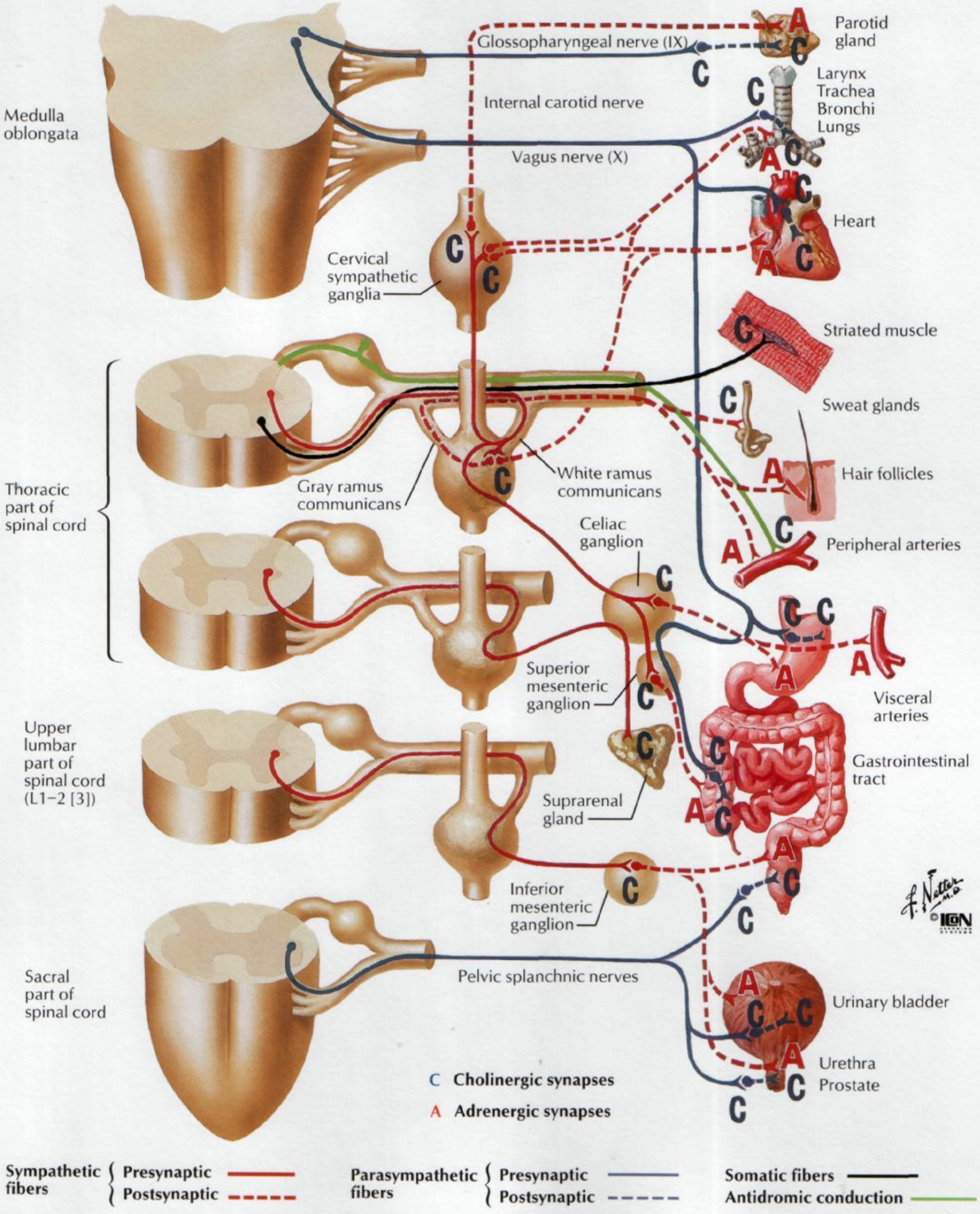
Autonomic Nervous System: Schema

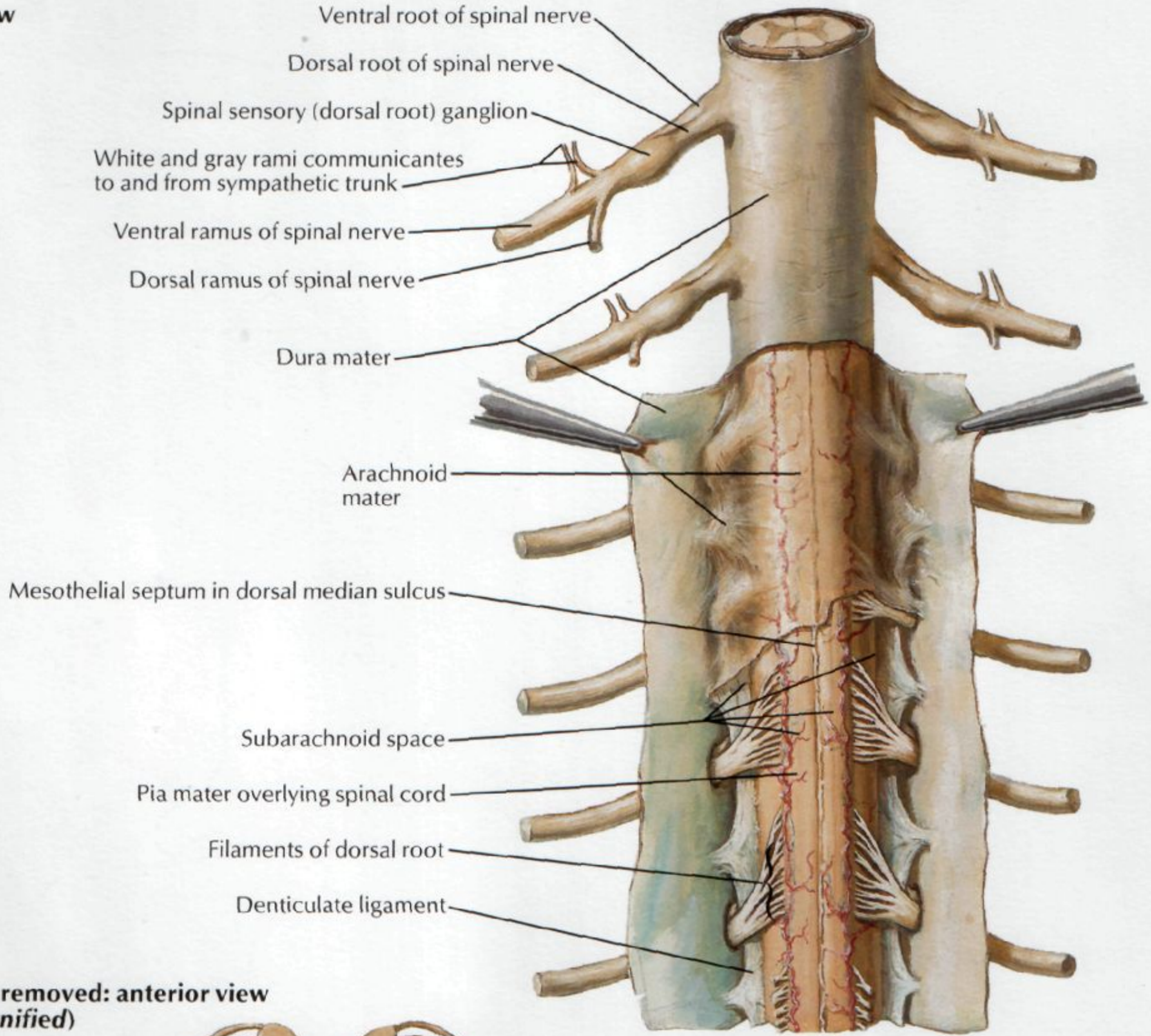


Cholinergic and Adrenergic Synapses: Schema

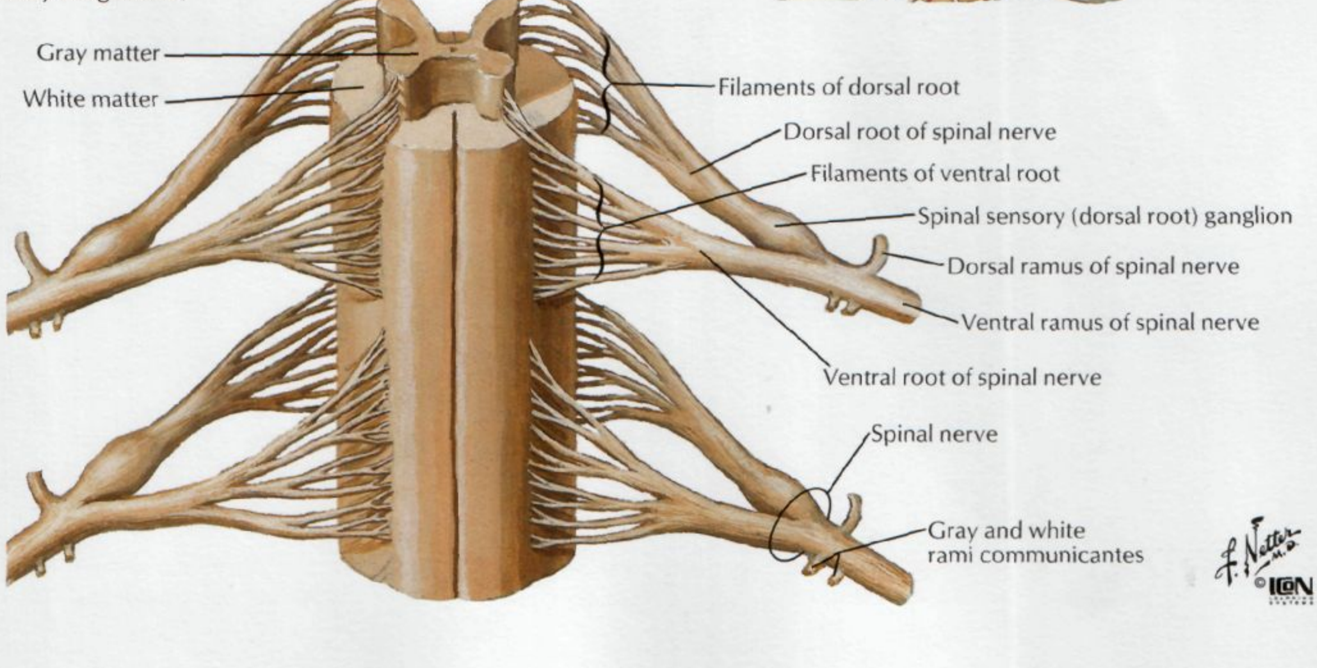


Spinal Membranes and Nerve Roots

Posterior view


Ventral root of spinal nerve
Dorsal root of spinal nerve
Spinal sensory (dorsal root) ganglion
White and gray rami communicantes to and from sympathetic trunk
Ventral ramus of spinal nerve
Dorsal ramus of spinal nerve
Dura mater
Arachnoid mater
Mesothelial septum in dorsal median sulcus
Subarachnoid space
Pia mater overlying spinal cord
Filaments of dorsal root
Denticulate ligament

Membranes removed: anterior view (*greatly magnified*)


Gray matter
White matter
Filaments of dorsal root
Dorsal root of spinal nerve
Filaments of ventral root
Spinal sensory (dorsal root) ganglion
Dorsal ramus of spinal nerve
Ventral ramus of spinal nerve
Ventral root of spinal nerve
Spinal nerve
Gray and white rami communicantes
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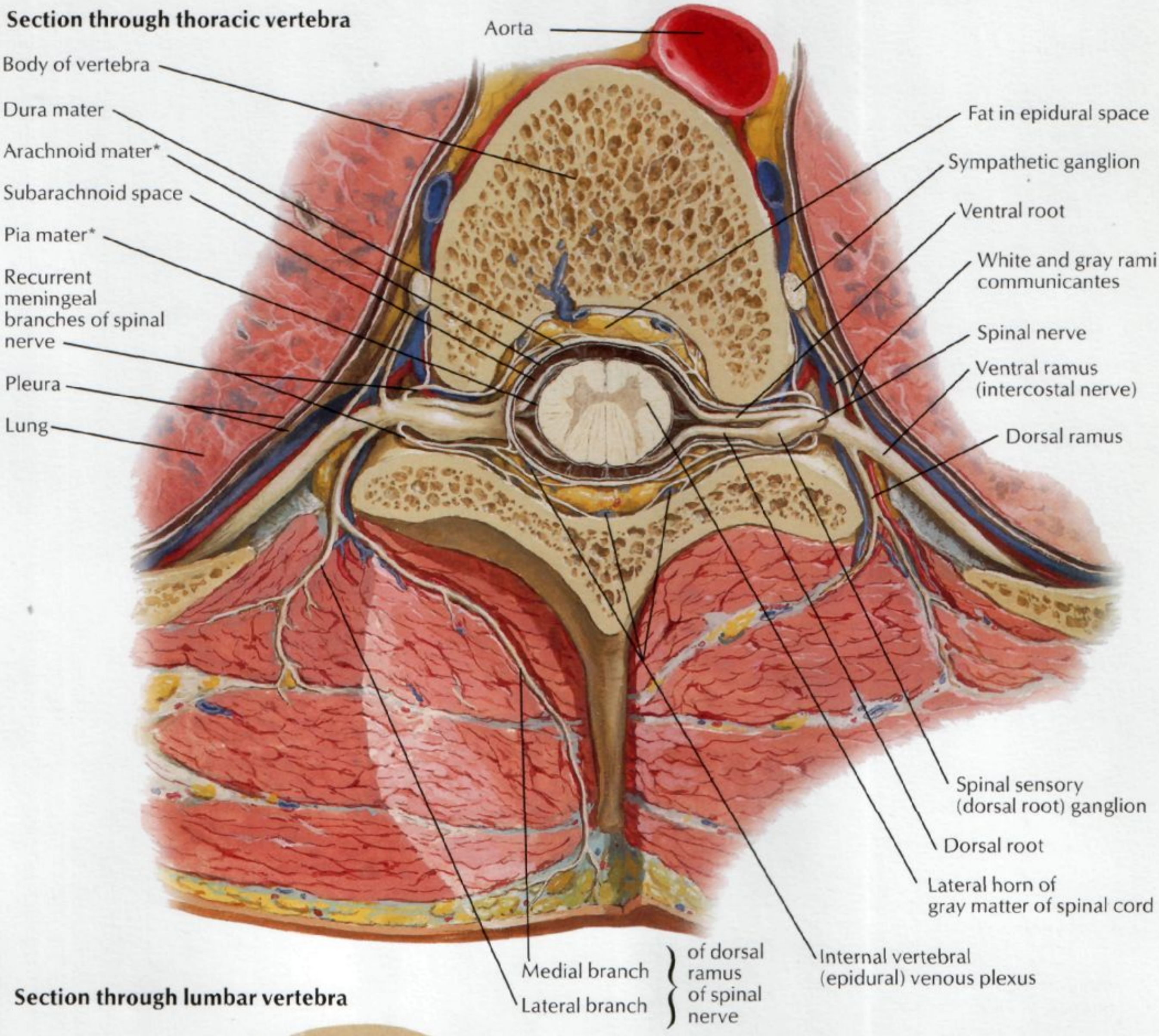
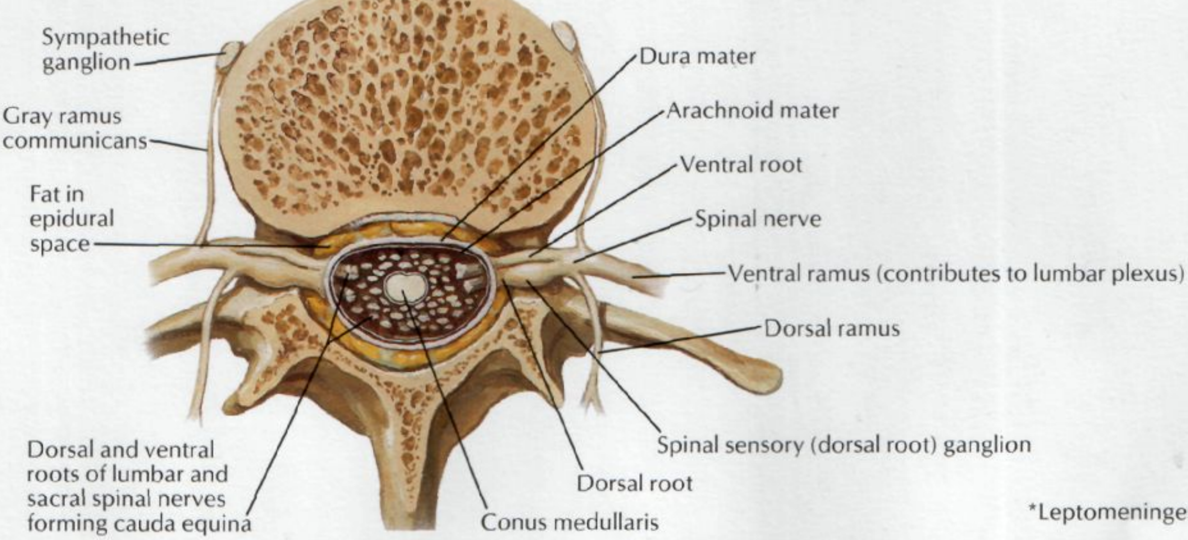
Spinal Nerve Origin: Cross Sections

SEE ALSO PLATES 161, 162, 165, 166

Section through thoracic vertebra


Aorta
Body of vertebra
Dura mater
Arachnoid mater*
Subarachnoid space
Pia mater*
Recurrent meningeal branches of spinal nerve
Pleura
Lung
Fat in epidural space
Sympathetic ganglion
Ventral root
White and gray rami communicantes
Spinal nerve
Ventral ramus (intercostal nerve)
Dorsal ramus
Spinal sensory (dorsal root) ganglion
Dorsal root
Lateral horn of gray matter of spinal cord
Internal vertebral (epidural) venous plexus
Medial branch
Lateral branch
of dorsal ramus of spinal nerve

Section through lumbar vertebra


Sympathetic ganglion
Gray ramus communicans
Fat in epidural space
Dorsal and ventral roots of lumbar and sacral spinal nerves forming cauda equina
Dura mater
Arachnoid mater
Ventral root
Spinal nerve
Ventral ramus (contributes to lumbar plexus)
Dorsal ramus
Spinal sensory (dorsal root) ganglion
Dorsal root
Conus medullaris

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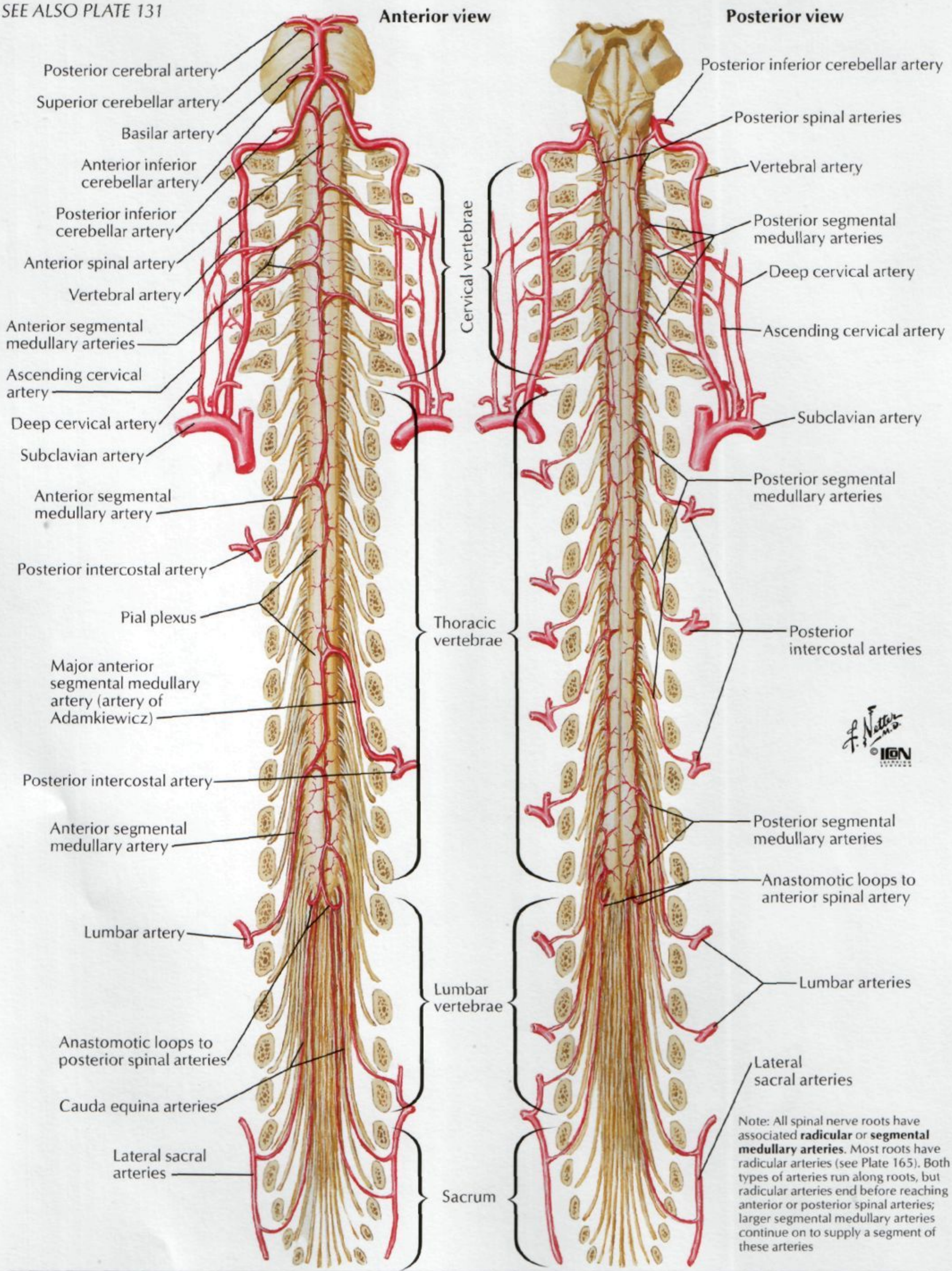
*Leptomeninges

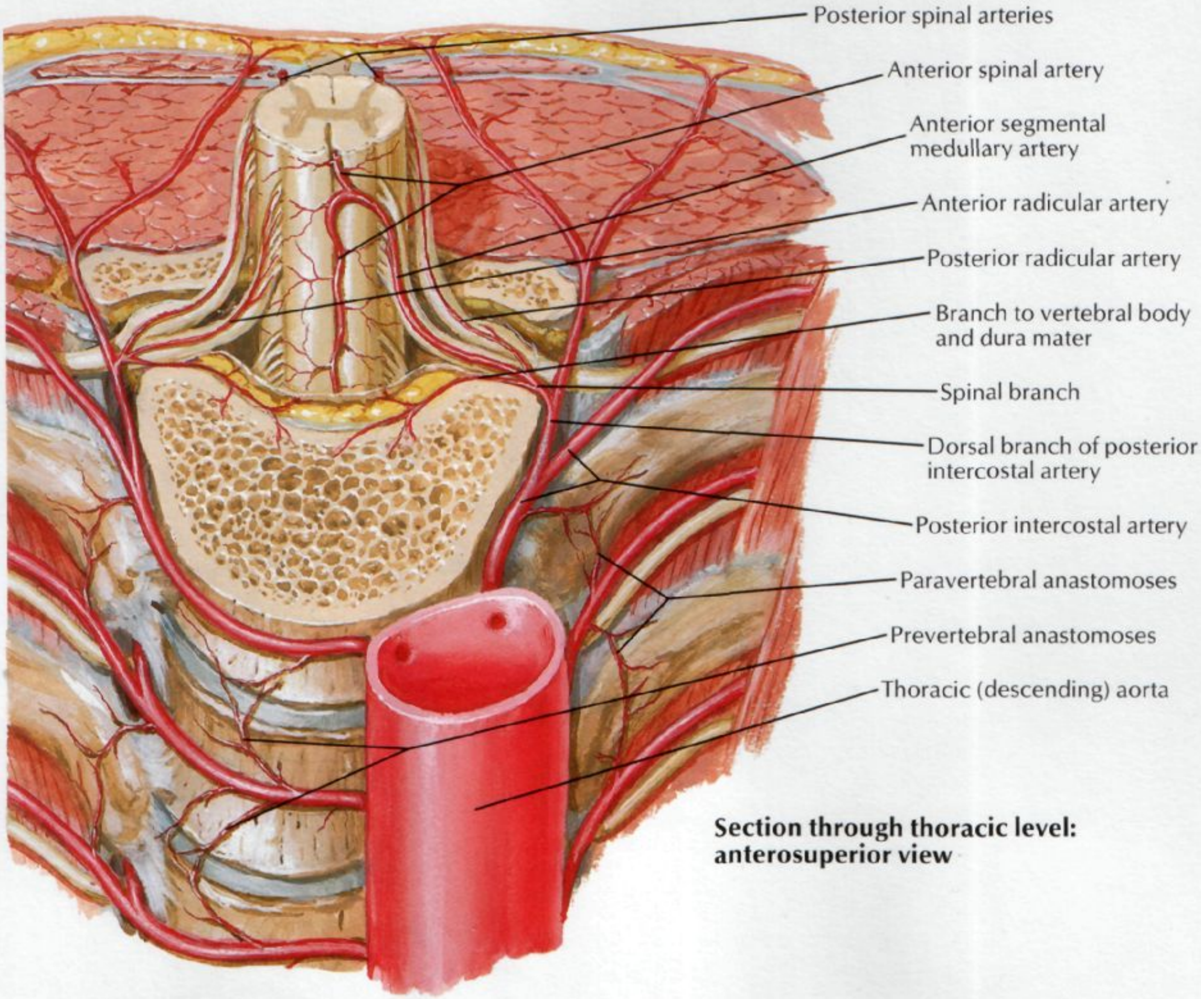
Arteries of Spinal Cord: Schema

SEE ALSO PLATE 131


Anterior view
Posterior cerebral artery
Superior cerebellar artery
Basilar artery
Anterior inferior cerebellar artery
Posterior inferior cerebellar artery
Anterior spinal artery
Vertebral artery
Anterior segmental medullary arteries
Ascending cervical artery
Deep cervical artery
Subclavian artery
Anterior segmental medullary artery
Posterior intercostal artery
Pial plexus
Major anterior segmental medullary artery (artery of Adamkiewicz)
Posterior intercostal artery
Anterior segmental medullary artery
Lumbar artery
Anastomotic loops to posterior spinal arteries
Cauda equina arteries
Lateral sacral arteries
Cervical vertebrae
Thoracic vertebrae
Lumbar vertebrae
Sacrum
Posterior view
Posterior inferior cerebellar artery
Posterior spinal arteries
Vertebral artery
Posterior segmental medullary arteries
Deep cervical artery
Ascending cervical artery
Subclavian artery
Posterior segmental medullary arteries
Posterior intercostal arteries
Posterior segmental medullary arteries
Anastomotic loops to anterior spinal artery
Lumbar arteries
Lateral sacral arteries
©ICON

Note: All spinal nerve roots have associated **radicular** or **segmental medullary arteries**. Most roots have radicular arteries (see Plate 165). Both types of arteries run along roots, but radicular arteries end before reaching anterior or posterior spinal arteries; larger segmental medullary arteries continue on to supply a segment of these arteries

Arteries of Spinal Cord: Intrinsic Distribution


Posterior spinal arteries
Anterior spinal artery
Anterior segmental medullary artery
Anterior radicular artery
Posterior radicular artery
Branch to vertebral body and dura mater
Spinal branch
Dorsal branch of posterior intercostal artery
Posterior intercostal artery
Paravertebral anastomoses
Prevertebral anastomoses
Thoracic (descending) aorta
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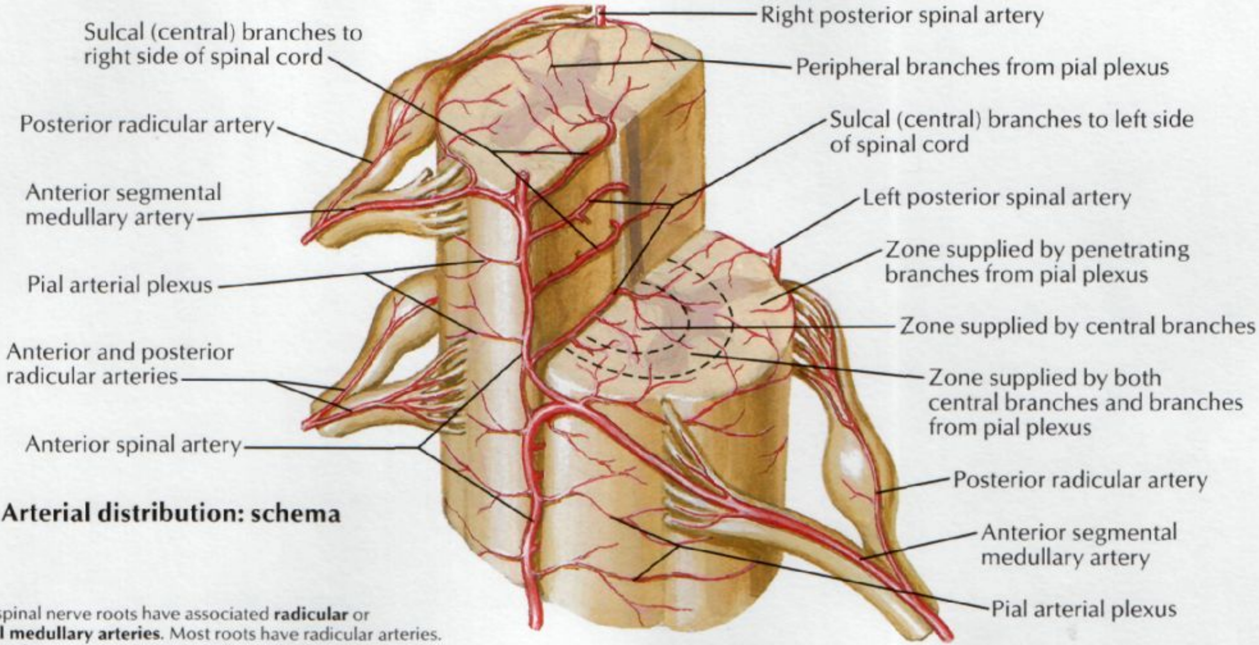
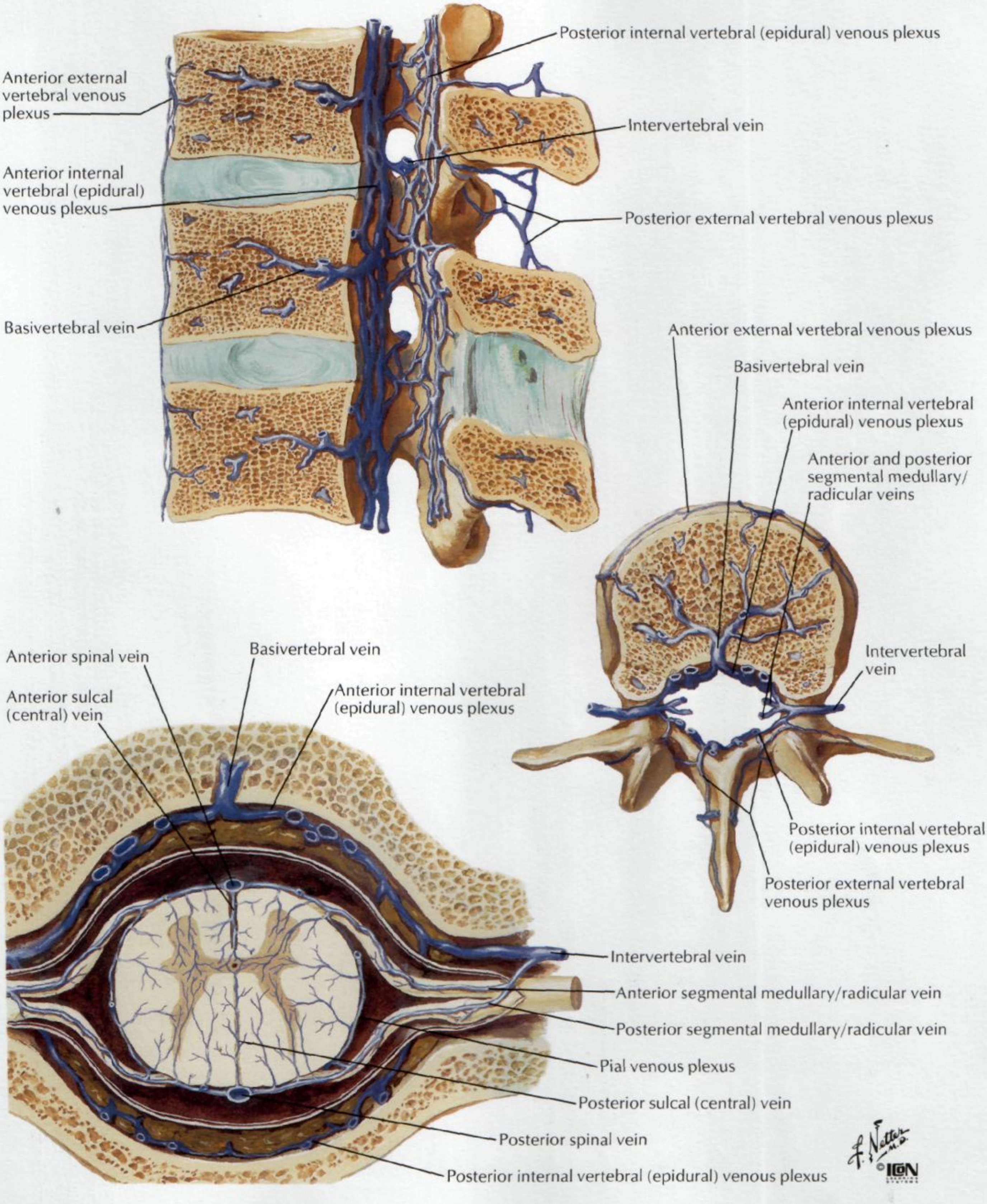
Section through thoracic level: anterosuperior view


Sulcal (central) branches to right side of spinal cord
Posterior radicular artery
Anterior segmental medullary artery
Pial arterial plexus
Anterior and posterior radicular arteries
Anterior spinal artery
Right posterior spinal artery
Peripheral branches from pial plexus
Sulcal (central) branches to left side of spinal cord
Left posterior spinal artery
Zone supplied by penetrating branches from pial plexus
Zone supplied by central branches
Zone supplied by both central branches and branches from pial plexus
Posterior radicular artery
Anterior segmental medullary artery
Pial arterial plexus

Arterial distribution: schema

Note: All spinal nerve roots have associated **radicular** or **segmental medullary arteries**. Most roots have radicular arteries. Both types of arteries run along roots, but radicular arteries end before reaching anterior or posterior spinal arteries; larger segmental medullary arteries continue on to supply a segment of these arteries

Veins of Spinal Cord and Vertebral Column


Posterior internal vertebral (epidural) venous plexus
Anterior external vertebral venous plexus
Intervertebral vein
Anterior internal vertebral (epidural) venous plexus
Posterior external vertebral venous plexus
Basivertebral vein
Anterior external vertebral venous plexus
Basivertebral vein
Anterior internal vertebral (epidural) venous plexus
Anterior and posterior segmental medullary/ radicular veins
Intervertebral vein
Posterior internal vertebral (epidural) venous plexus
Posterior external vertebral venous plexus
Anterior spinal vein
Anterior sulcal (central) vein
Basivertebral vein
Anterior internal vertebral (epidural) venous plexus
Intervertebral vein
Anterior segmental medullary/radicular vein
Posterior segmental medullary/radicular vein
Pial venous plexus
Posterior sulcal (central) vein
Posterior spinal vein
Posterior internal vertebral (epidural) venous plexus
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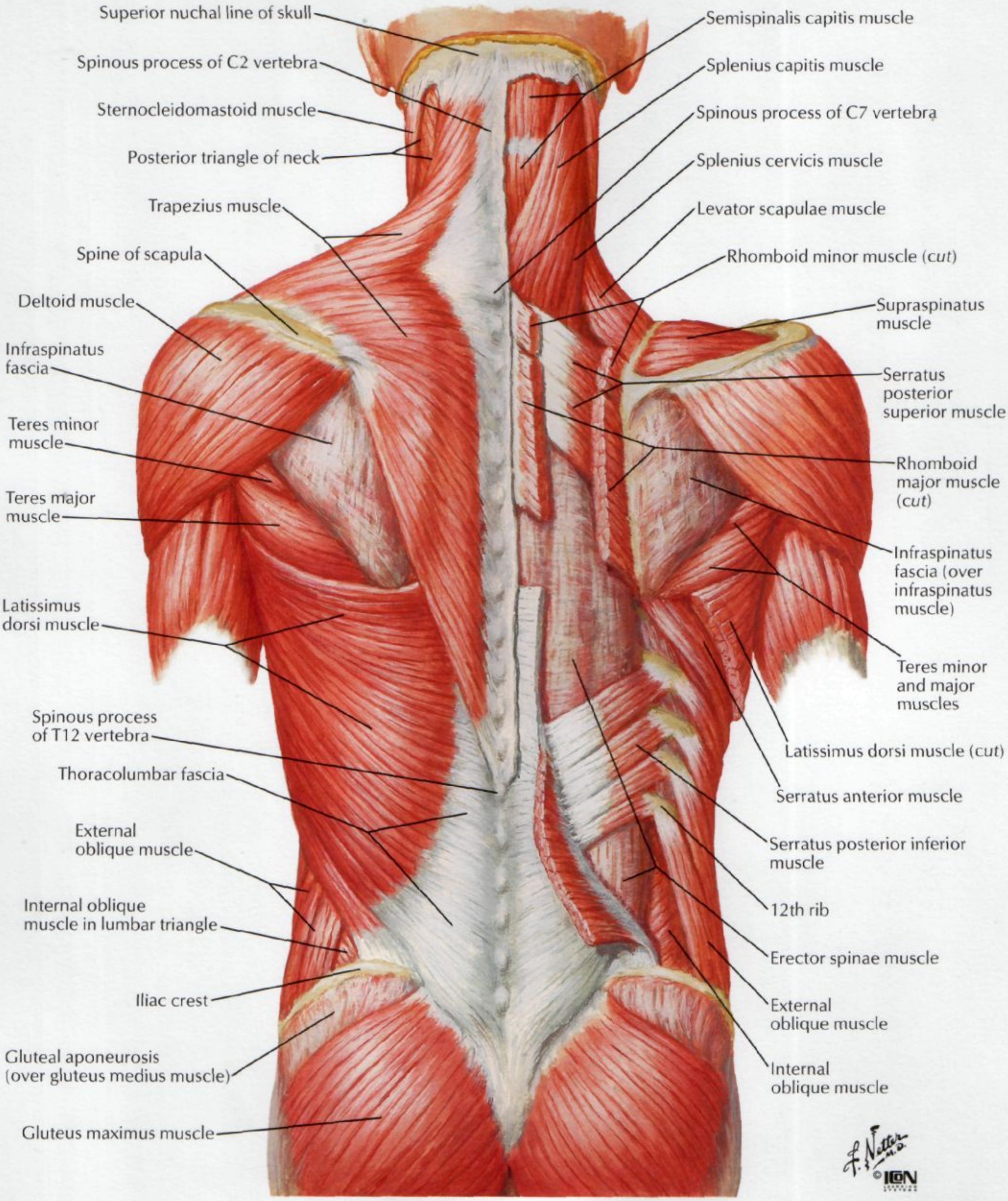
Muscles of Back: Superficial Layers


Superior nuchal line of skull
Spinous process of C2 vertebra
Sternocleidomastoid muscle
Posterior triangle of neck
Trapezius muscle
Spine of scapula
Deltoid muscle
Infraspinatus fascia
Teres minor muscle
Teres major muscle
Latissimus dorsi muscle
Spinous process of T12 vertebra
Thoracolumbar fascia
External oblique muscle
Internal oblique muscle in lumbar triangle
Iliac crest
Gluteal aponeurosis (over gluteus medius muscle)
Gluteus maximus muscle
Semispinalis capitis muscle
Splenius capitis muscle
Spinous process of C7 vertebra
Splenius cervicis muscle
Levator scapulae muscle
Rhomboid minor muscle (*cut*)
Supraspinatus muscle
Serratus posterior superior muscle
Rhomboid major muscle (*cut*)
Infraspinatus fascia (over infraspinatus muscle)
Teres minor and major muscles
Latissimus dorsi muscle (cut)
Serratus anterior muscle
Serratus posterior inferior muscle
12th rib
Erector spinae muscle
External oblique muscle
Internal oblique muscle
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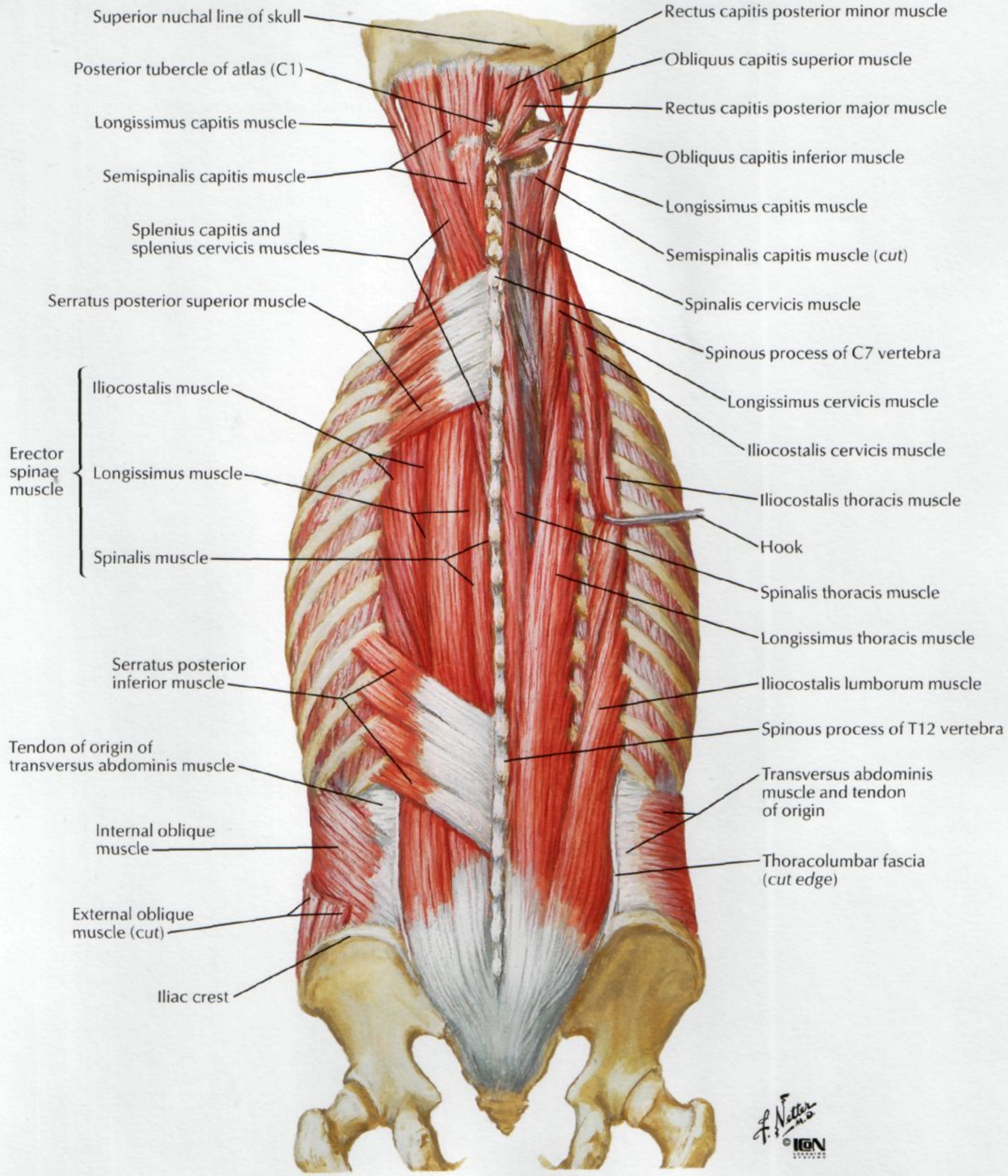
Muscles of Back: Intermediate Layers


Superior nuchal line of skull
Posterior tubercle of atlas (C1)
Longissimus capitis muscle
Semispinalis capitis muscle
Splenius capitis and splenius cervicis muscles
Serratus posterior superior muscle
Erector spinae muscle
Iliocostalis muscle
Longissimus muscle
Spinalis muscle
Serratus posterior inferior muscle
Tendon of origin of transversus abdominis muscle
Internal oblique muscle
External oblique muscle (cut)
Iliac crest
Rectus capitis posterior minor muscle
Obliquus capitis superior muscle
Rectus capitis posterior major muscle
Obliquus capitis inferior muscle
Longissimus capitis muscle
Semispinalis capitis muscle (cut)
Spinalis cervicis muscle
Spinous process of C7 vertebra
Longissimus cervicis muscle
Iliocostalis cervicis muscle
Iliocostalis thoracis muscle
Hook
Spinalis thoracis muscle
Longissimus thoracis muscle
Iliocostalis lumborum muscle
Spinous process of T12 vertebra
Transversus abdominis muscle and tendon of origin
Thoracolumbar fascia (cut edge)
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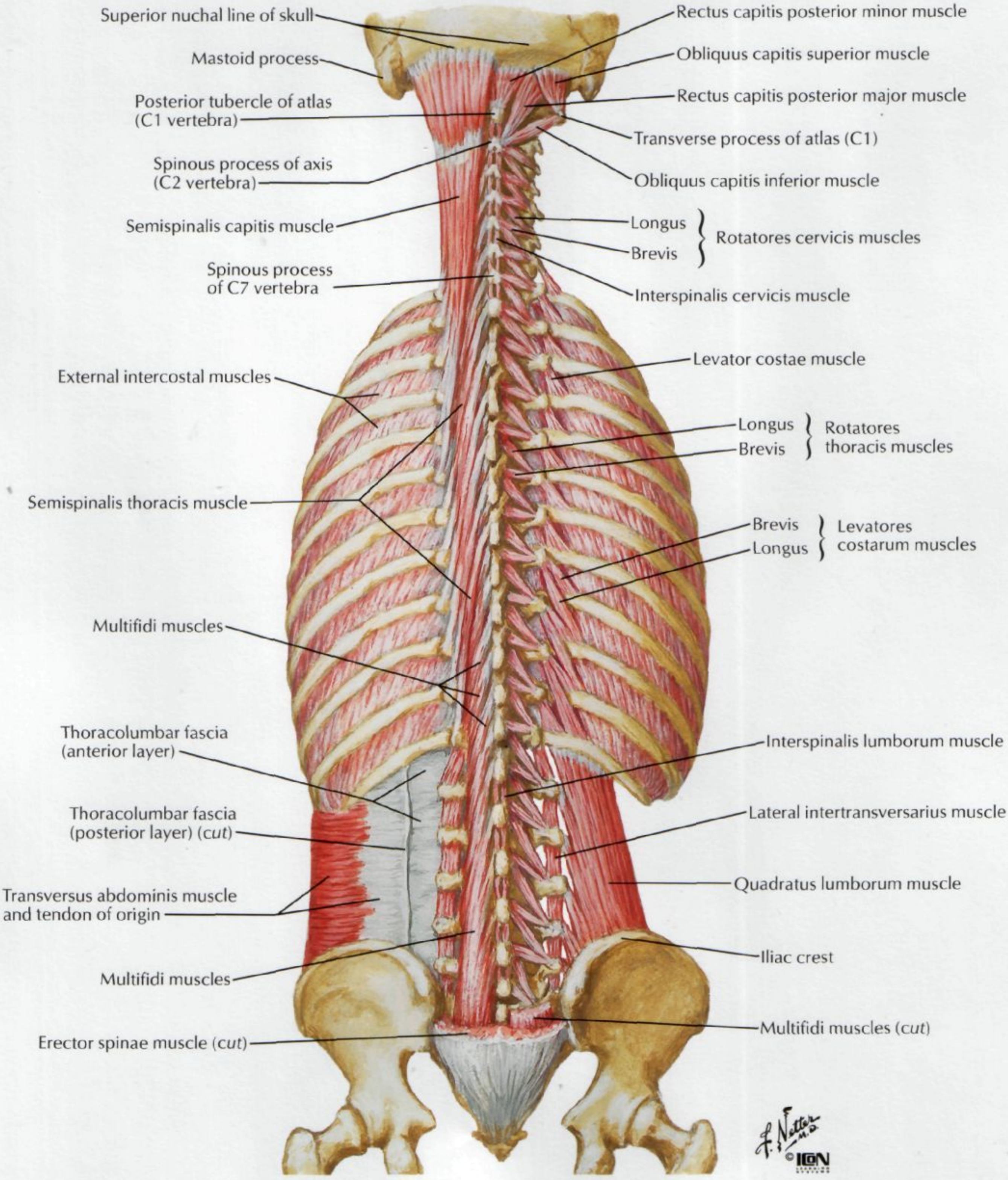
Muscles of Back: Deep Layers


Superior nuchal line of skull
Mastoid process
Posterior tubercle of atlas (C1 vertebra)
Spinous process of axis (C2 vertebra)
Semispinalis capitis muscle
Spinous process of C7 vertebra
External intercostal muscles
Semispinalis thoracis muscle
Multifidi muscles
Thoracolumbar fascia (anterior layer)
Thoracolumbar fascia (posterior layer) (*cut*)
Transversus abdominis muscle and tendon of origin
Multifidi muscles
Erector spinae muscle (*cut*)
Rectus capitis posterior minor muscle
Obliquus capitis superior muscle
Rectus capitis posterior major muscle
Transverse process of atlas (C1)
Obliquus capitis inferior muscle
Longus
Brevis
Rotatores cervicis muscles
Interspinalis cervicis muscle
Levator costae muscle
Longus
Brevis
Rotatores thoracis muscles
Brevis
Longus
Levatores costarum muscles
Interspinalis lumborum muscle
Lateral intertransversarius muscle
Quadratus lumborum muscle
Iliac crest
Multifidi muscles (*cut*)
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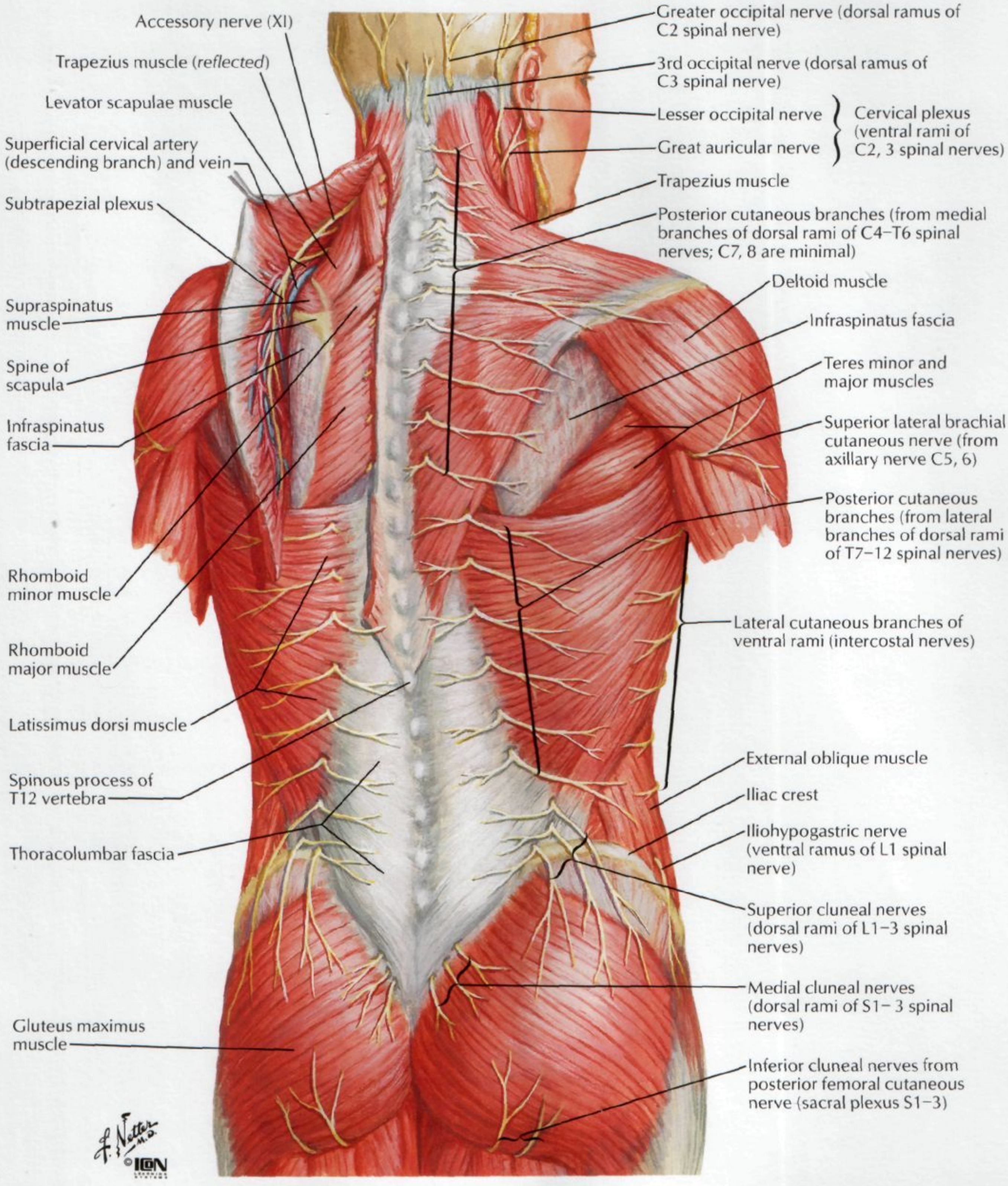
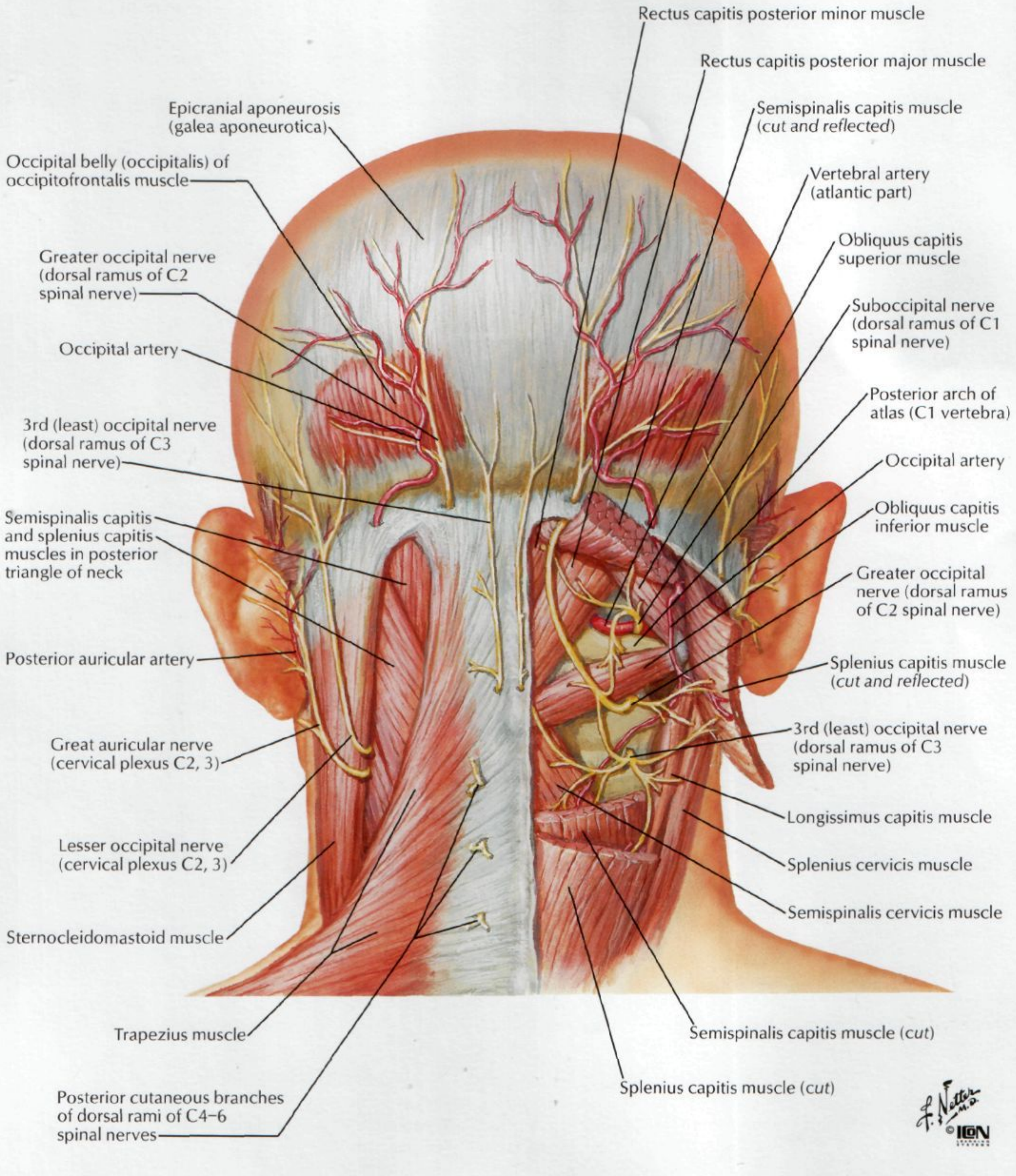
Nerves of Back

SEE ALSO PLATES 173, 187, 246, 250


Accessory nerve (XI)
Trapezius muscle (*reflected*)
Levator scapulae muscle
Superficial cervical artery (descending branch) and vein
Subtrapezial plexus
Supraspinatus muscle
Spine of scapula
Infraspinatus fascia
Rhomboid minor muscle
Rhomboid major muscle
Latissimus dorsi muscle
Spinous process of T12 vertebra
Thoracolumbar fascia
Gluteus maximus muscle
F. Netter M.D.
©ICON
Greater occipital nerve (dorsal ramus of C2 spinal nerve)
3rd occipital nerve (dorsal ramus of C3 spinal nerve)
Lesser occipital nerve
Great auricular nerve
Cervical plexus (ventral rami of C2, 3 spinal nerves)
Trapezius muscle
Posterior cutaneous branches (from medial branches of dorsal rami of C4–T6 spinal nerves; C7, 8 are minimal)
Deltoid muscle
Infraspinatus fascia
Teres minor and major muscles
Superior lateral brachial cutaneous nerve (from axillary nerve C5, 6)
Posterior cutaneous branches (from lateral branches of dorsal rami of T7–12 spinal nerves)
Lateral cutaneous branches of ventral rami (intercostal nerves)
External oblique muscle
Iliac crest
Iliohypogastric nerve (ventral ramus of L1 spinal nerve)
Superior cluneal nerves (dorsal rami of L1–3 spinal nerves)
Medial cluneal nerves (dorsal rami of S1–3 spinal nerves)
Inferior cluneal nerves from posterior femoral cutaneous nerve (sacral plexus S1–3)

Suboccipital Triangle


Epicranial aponeurosis (galea aponeurotica)
Occipital belly (occipitalis) of occipitofrontalis muscle
Greater occipital nerve (dorsal ramus of C2 spinal nerve)
Occipital artery
3rd (least) occipital nerve (dorsal ramus of C3 spinal nerve)
Semispinalis capitis and splenius capitis muscles in posterior triangle of neck
Posterior auricular artery
Great auricular nerve (cervical plexus C2, 3)
Lesser occipital nerve (cervical plexus C2, 3)
Sternocleidomastoid muscle
Trapezius muscle
Posterior cutaneous branches of dorsal rami of C4–6 spinal nerves
Rectus capitis posterior minor muscle
Rectus capitis posterior major muscle
Semispinalis capitis muscle (cut and reflected)
Vertebral artery (atlantic part)
Obliquus capitis superior muscle
Suboccipital nerve (dorsal ramus of C1 spinal nerve)
Posterior arch of atlas (C1 vertebra)
Occipital artery
Obliquus capitis inferior muscle
Greater occipital nerve (dorsal ramus of C2 spinal nerve)
Splenius capitis muscle (cut and reflected)
3rd (least) occipital nerve (dorsal ramus of C3 spinal nerve)
Longissimus capitis muscle
Splenius cervicis muscle
Semispinalis cervicis muscle
Semispinalis capitis muscle (cut)
Splenius capitis muscle (cut)
F. Netter M.D.
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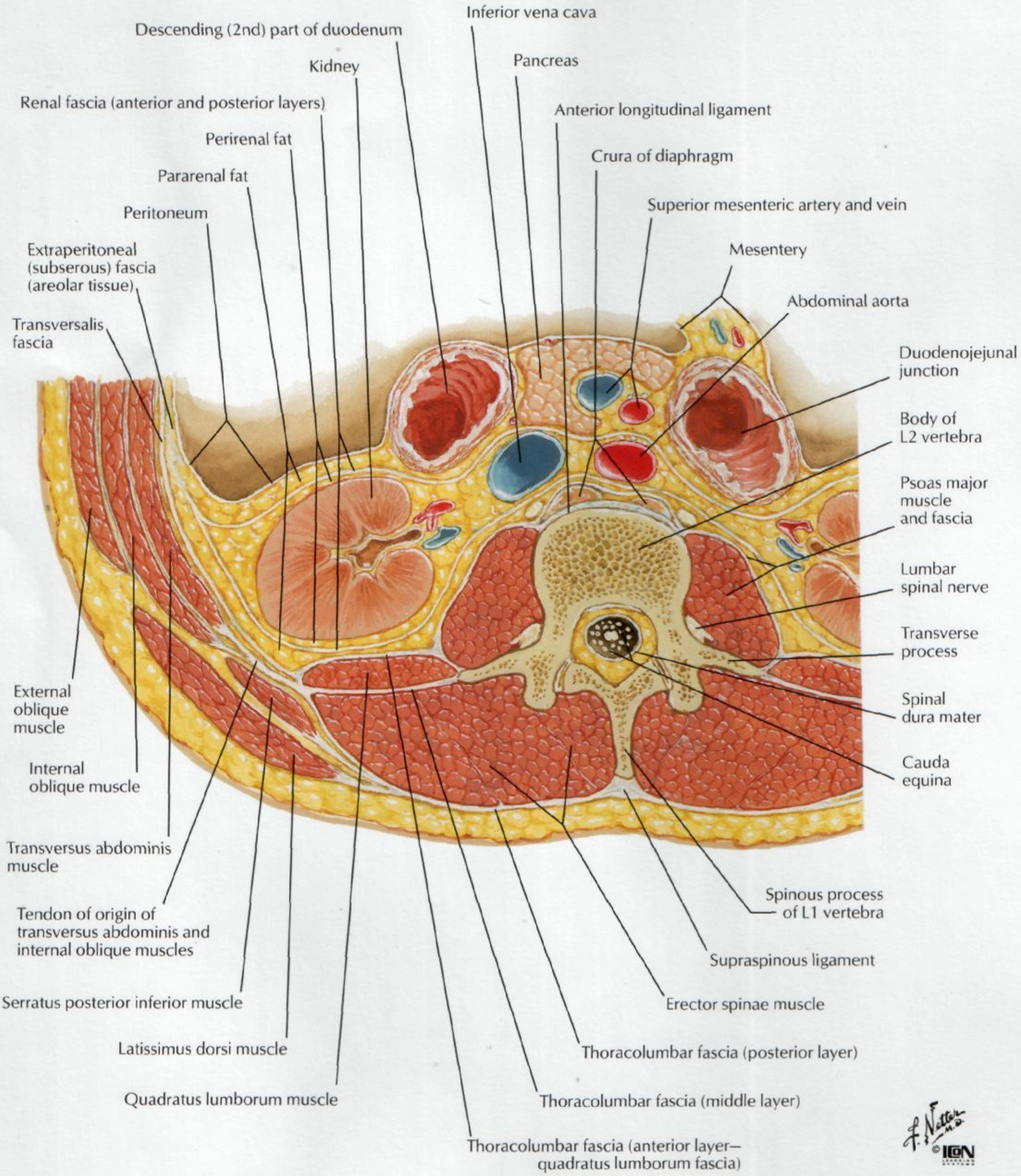
Lumbar Region of Back: Cross Section



Inferior vena cava
Descending (2nd) part of duodenum
Pancreas
Kidney
Renal fascia (anterior and posterior layers)
Anterior longitudinal ligament
Perirenal fat
Crura of diaphragm
Pararenal fat
Superior mesenteric artery and vein
Peritoneum
Mesentery
Extraperitoneal (subserous) fascia (areolar tissue)
Abdominal aorta
Transversalis fascia
Duodenojejunal junction
Body of L2 vertebra
Psoas major muscle and fascia
Lumbar spinal nerve
Transverse process
External oblique muscle
Spinal dura mater
Internal oblique muscle
Cauda equina
Transversus abdominis muscle
Tendon of origin of transversus abdominis and internal oblique muscles
Spinous process of L1 vertebra
Supraspinous ligament
Serratus posterior inferior muscle
Erector spinae muscle
Latissimus dorsi muscle
Thoracolumbar fascia (posterior layer)
Quadratus lumborum muscle
Thoracolumbar fascia (middle layer)
Thoracolumbar fascia (anterior layer–quadratus lumborum fascia)
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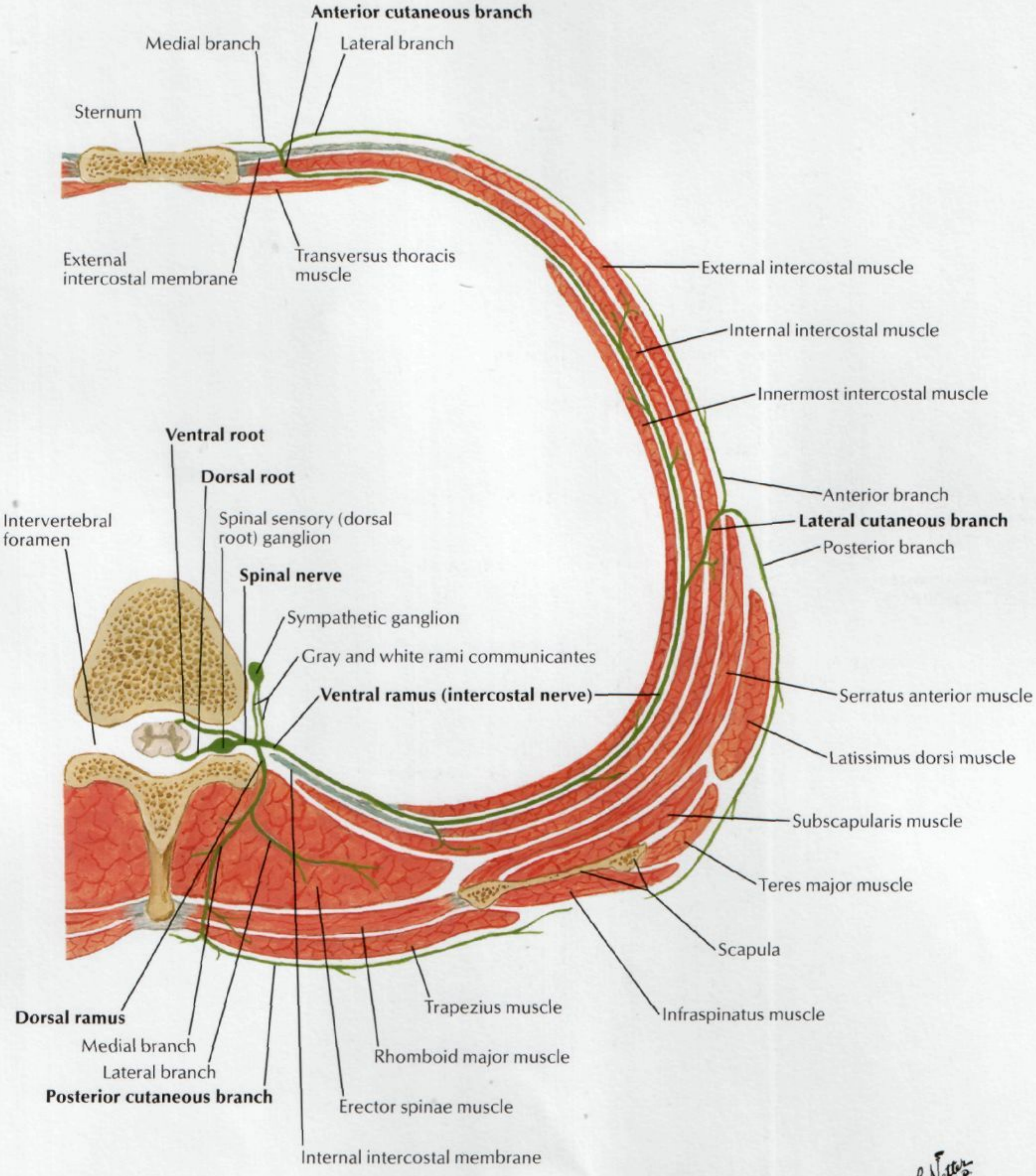
Typical Thoracic Spinal Nerve

SEE ALSO PLATES 187, 250



Note: In lower thoracic region, lateral branch of dorsal ramus is longer, motor and cutaneous; medial branch is shorter and motor only

Section III
THORAX

SURFACE ANATOMY
Plate 174

174. Thorax

MAMMARY GLAND
Plates 175–177

175. Mammary Gland
176. Arteries of Mammary Gland
177. Lymph Vessels and Nodes of Mammary Gland

BODY WALL
Plates 178–191

178. Bony Framework of Thorax
179. Ribs and Sternocostal Joints
180. Costovertebral Joints
181. Cervical Ribs and Related Anomalies
182. Anterior Thoracic Wall
183. Anterior Thoracic Wall (*continued*)
184. Anterior Thoracic Wall: Internal View
185. Posterior and Lateral Thoracic Walls
186. Posterior Thoracic Wall
187. Intercostal Nerves and Arteries
188. Diaphragm: Thoracic Surface
189. Diaphragm: Abdominal Surface
190. Phrenic Nerve
191. Muscles of Respiration

LUNGS
Plates 192–206

192. Topography of Lungs: Anterior View
193. Topography of Lungs: Posterior View
194. Lungs In Situ: Anterior View
195. Lungs: Medial Views
196. Bronchopulmonary Segments
197. Bronchopulmonary Segments (*continued*)
198. Trachea and Major Bronchi
199. Nomenclature of Bronchi: Schema

200. Intrapulmonary Airways: Schema
201. Intrapulmonary Blood Circulation: Schema
202. Great Vessels of Superior Mediastinum
203. Bronchial Arteries and Veins
204. Lymph Vessels and Nodes of Lung
205. Autonomic Nerves in Thorax
206. Innervation of Tracheobronchial Tree: Schema

HEART
Plates 207–225

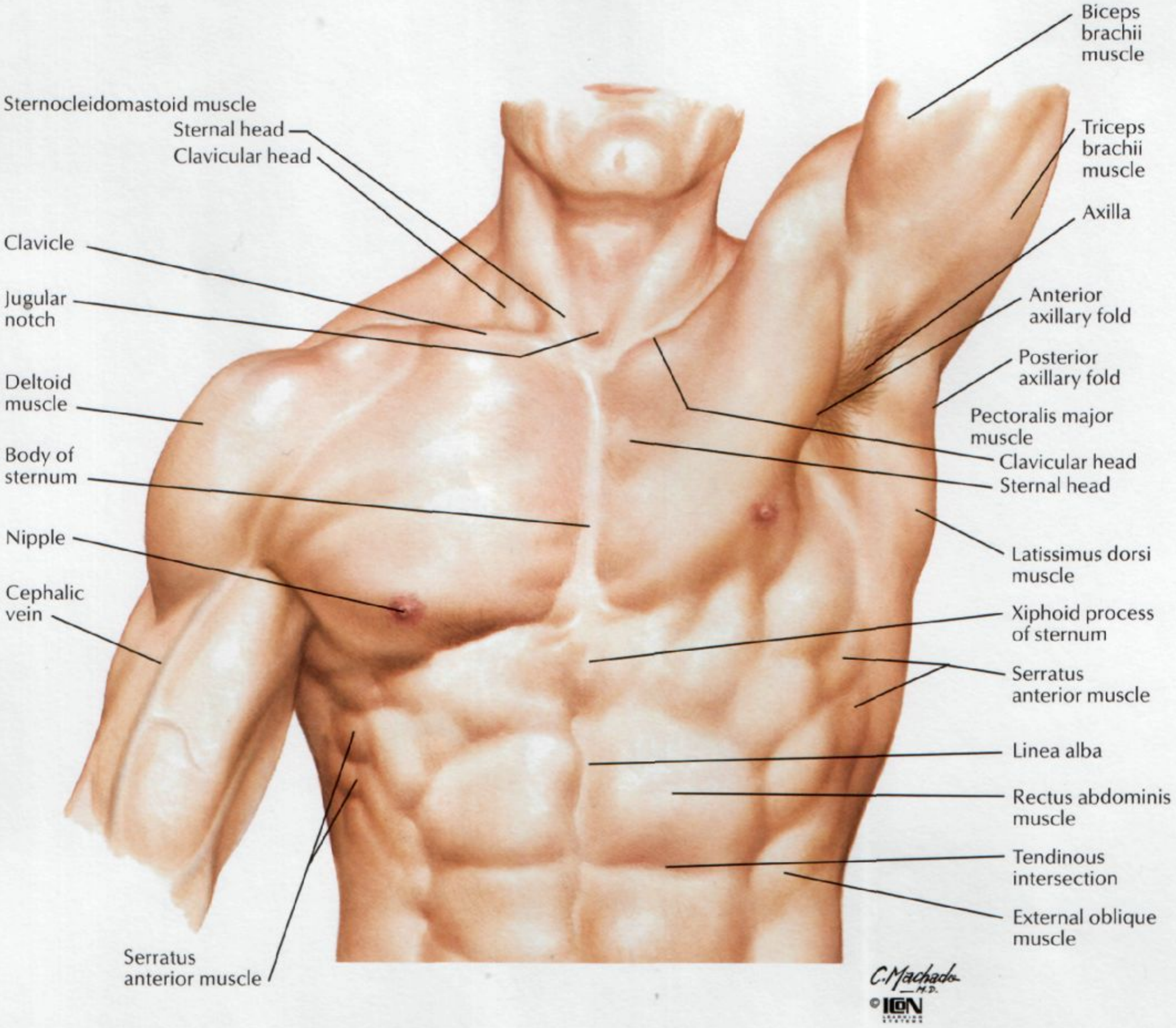
207. Heart In Situ
208. Heart: Anterior Exposure
209. Radiograph of Chest
210. Heart: Base and Diaphragmatic Surfaces
211. Pericardial Sac
212. Coronary Arteries and Cardiac Veins
213. Coronary Arteries and Cardiac Veins: Variations
214. Coronary Arteries: Arteriographic Views
215. Coronary Arteries: Arteriographic Views (*continued*)
216. Right Atrium and Ventricle
217. Left Atrium and Ventricle
218. Valves and Fibrous Skeleton of Heart
219. Valves and Fibrous Skeleton of Heart (*continued*)
220. Atria, Ventricles and Interventricular Septum
221. Conducting System of Heart
222. Nerves of Heart
223. Innervation of Heart: Schema
224. Innervation of Blood Vessels: Schema
225. Prenatal and Postnatal Circulation

MEDIASTINUM
Plates 226–237

226. Mediastinum: Right Lateral View
227. Mediastinum: Left Lateral View
228. Esophagus In Situ
229. Topography and Constrictions of Esophagus
230. Musculature of Esophagus
231. Pharyngoesophageal Junction
232. Esophagogastric Junction
233. Arteries of Esophagus
234. Veins of Esophagus
235. Lymph Vessels and Nodes of Esophagus
236. Nerves of Esophagus
237. Mediastinum: Cross Section

REGIONAL SCANS
Plate 238

238. Chest Scans: Axial CT Images


Sternocleidomastoid muscle
Sternal head
Clavicular head
Clavicle
Jugular notch
Deltoid muscle
Body of sternum
Nipple
Cephalic vein
Serratus anterior muscle
Biceps brachii muscle
Triceps brachii muscle
Axilla
Anterior axillary fold
Posterior axillary fold
Pectoralis major muscle
Clavicular head
Sternal head
Latissimus dorsi muscle
Xiphoid process of sternum
Serratus anterior muscle
Linea alba
Rectus abdominis muscle
Tendinous intersection
External oblique muscle
C.Machado M.D.
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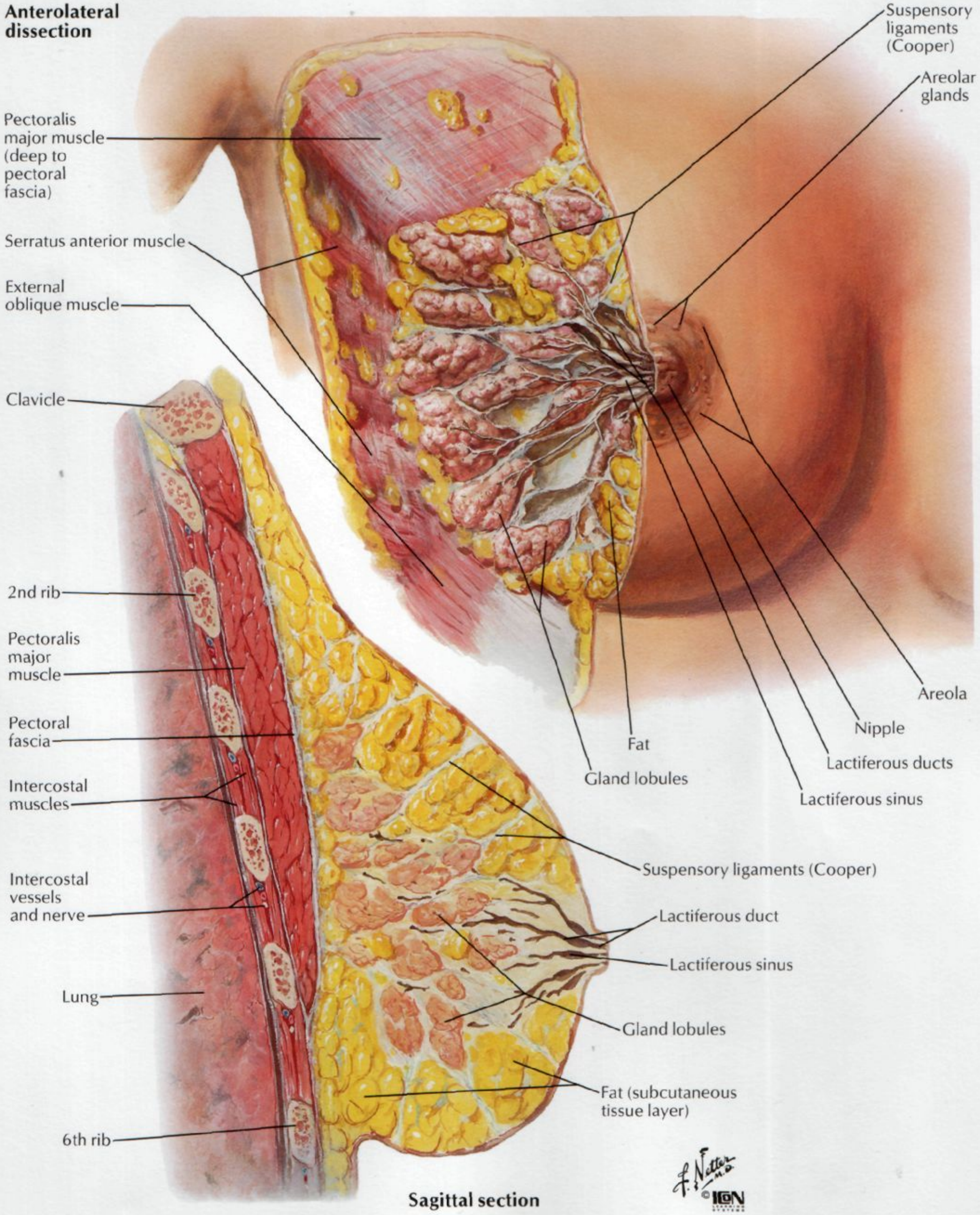
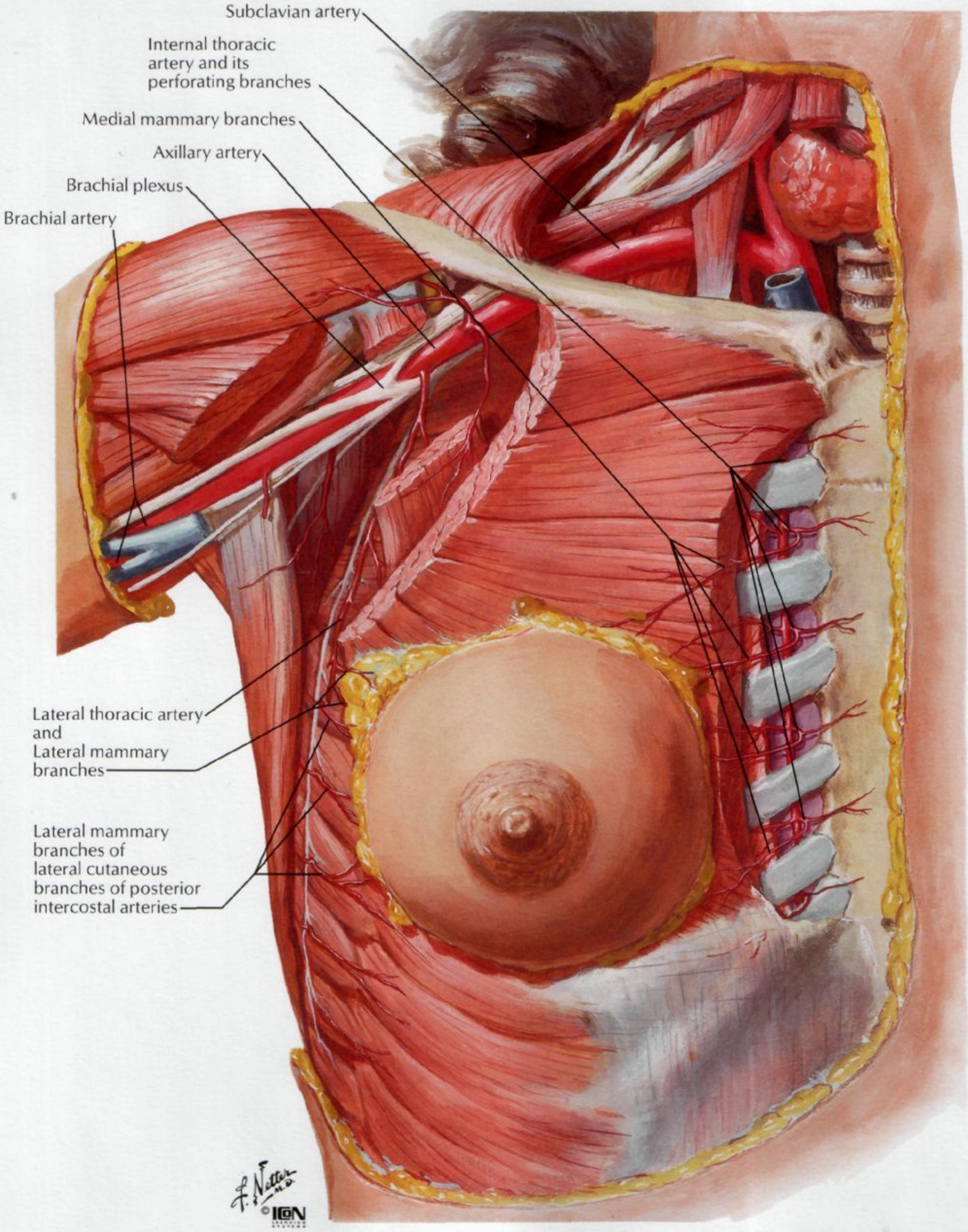
Mammary Gland




Subclavian artery
Internal thoracic artery and its perforating branches
Medial mammary branches
Axillary artery
Brachial plexus
Brachial artery
Lateral thoracic artery and
Lateral mammary branches
Lateral mammary branches of lateral cutaneous branches of posterior intercostal arteries
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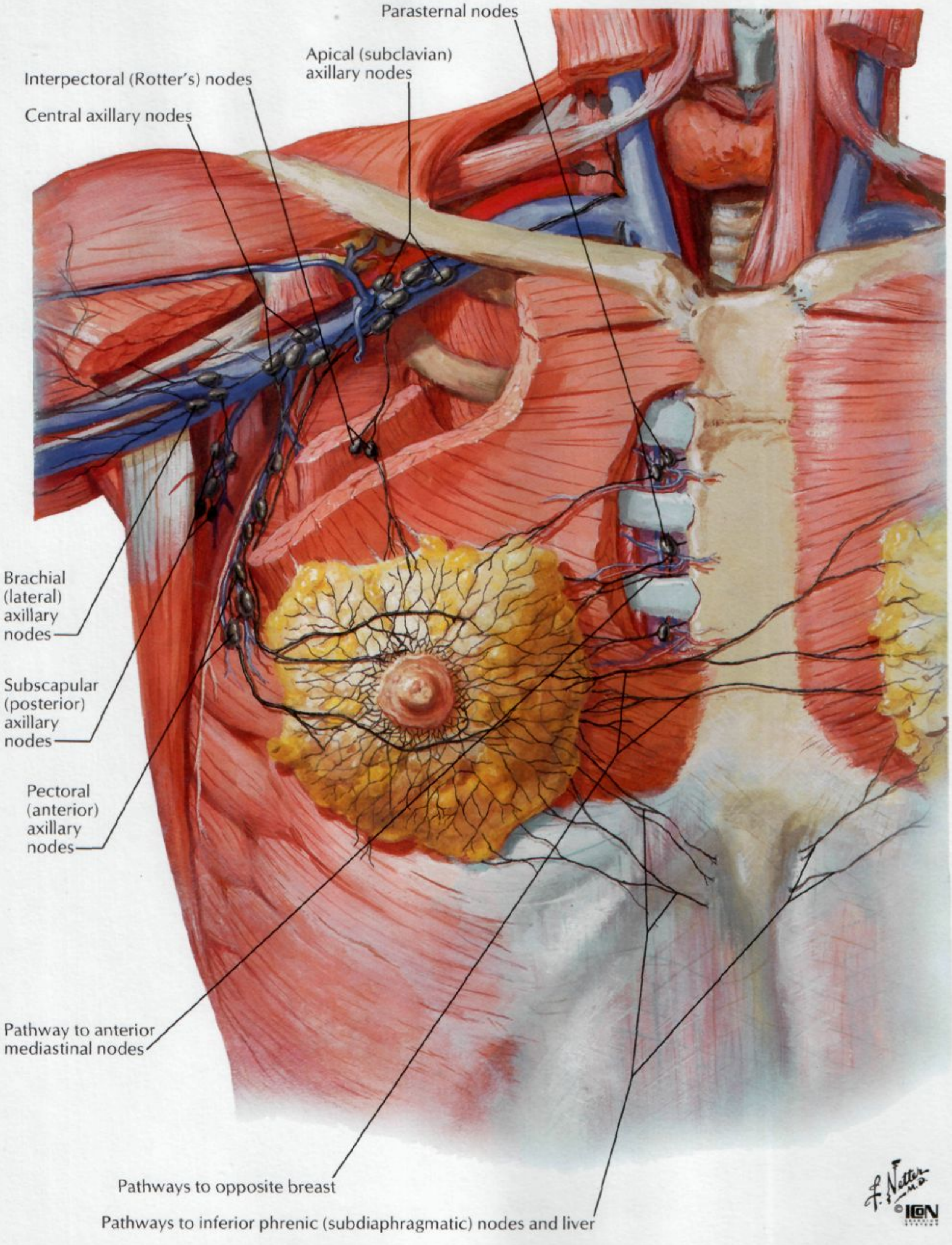
Lymph Vessels and Nodes of Mammary Gland


Parasternal nodes
Apical (subclavian) axillary nodes
Interpectoral (Rotter's) nodes
Central axillary nodes
Brachial (lateral) axillary nodes
Subscapular (posterior) axillary nodes
Pectoral (anterior) axillary nodes
Pathway to anterior mediastinal nodes
Pathways to opposite breast
Pathways to inferior phrenic (subdiaphragmatic) nodes and liver
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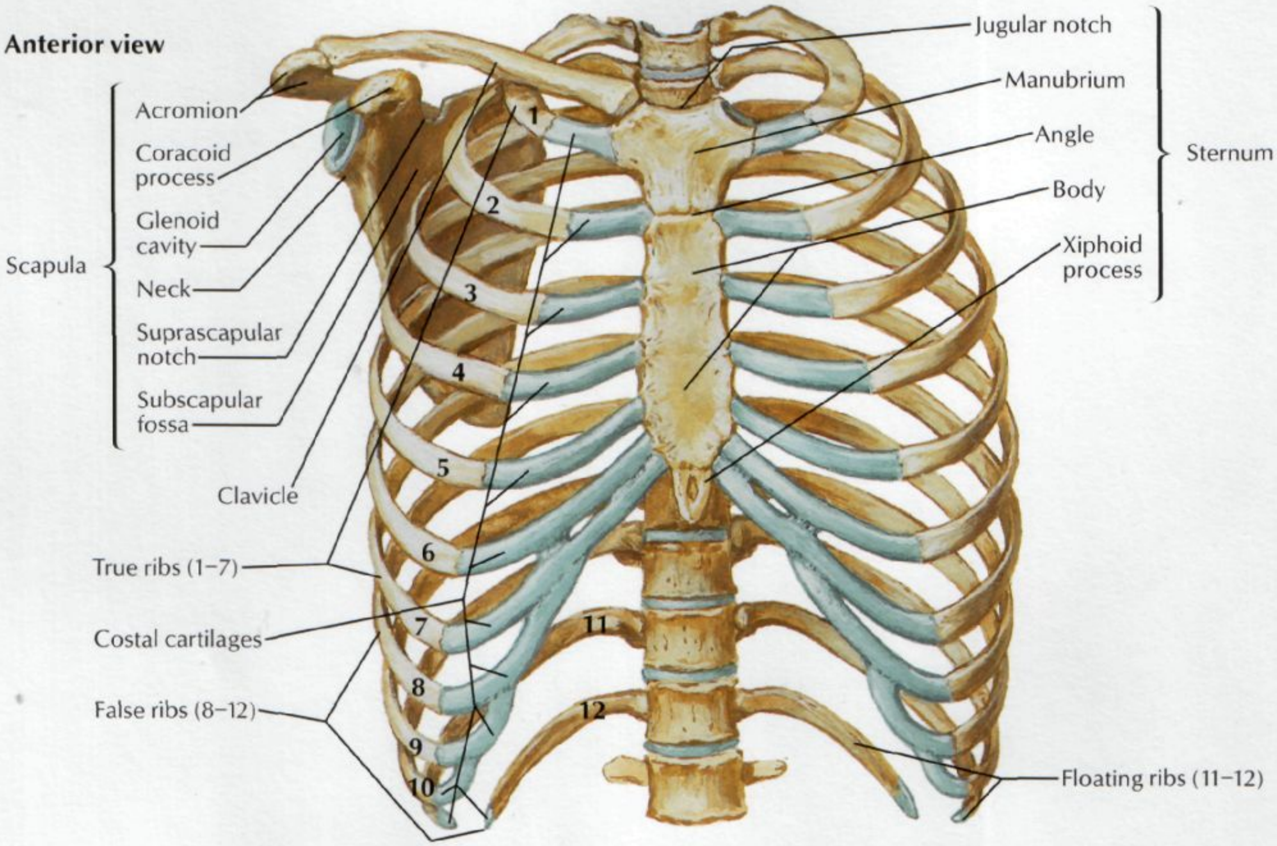
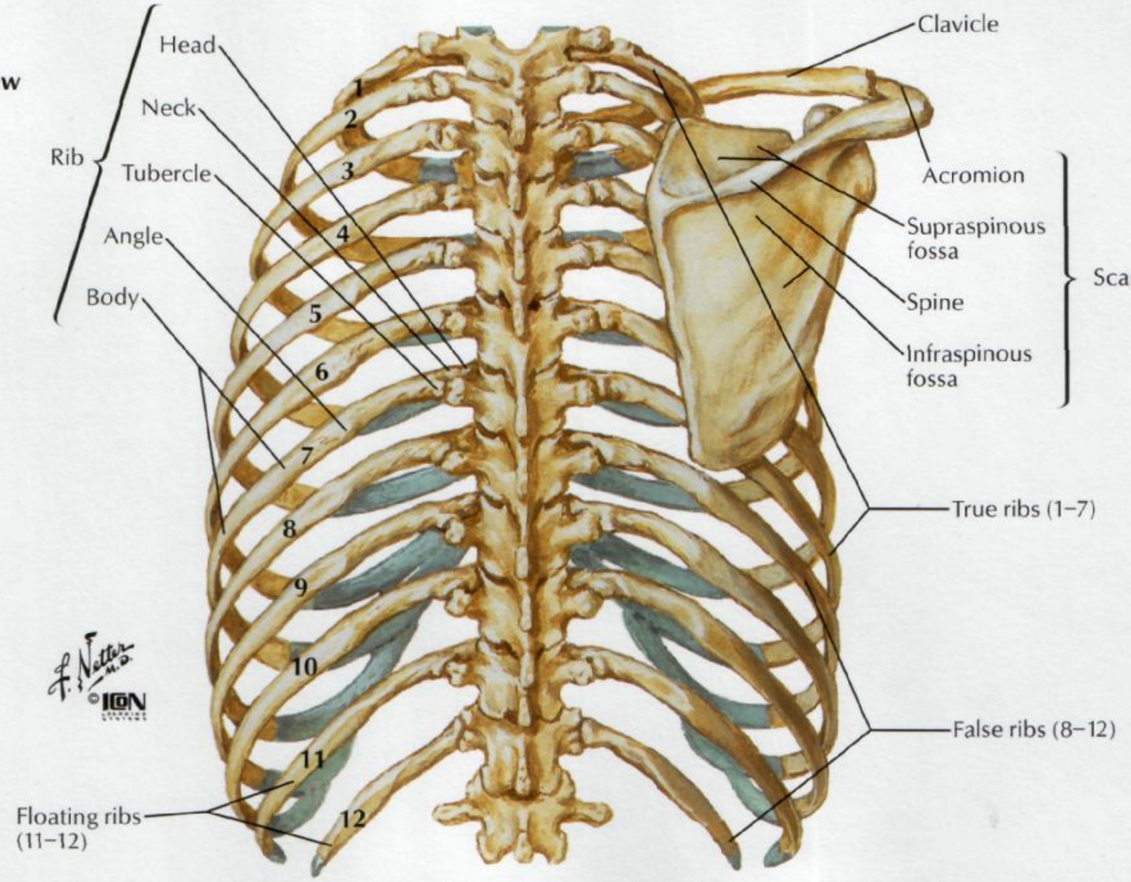
Bony Framework of Thorax

SEE ALSO PLATE 240

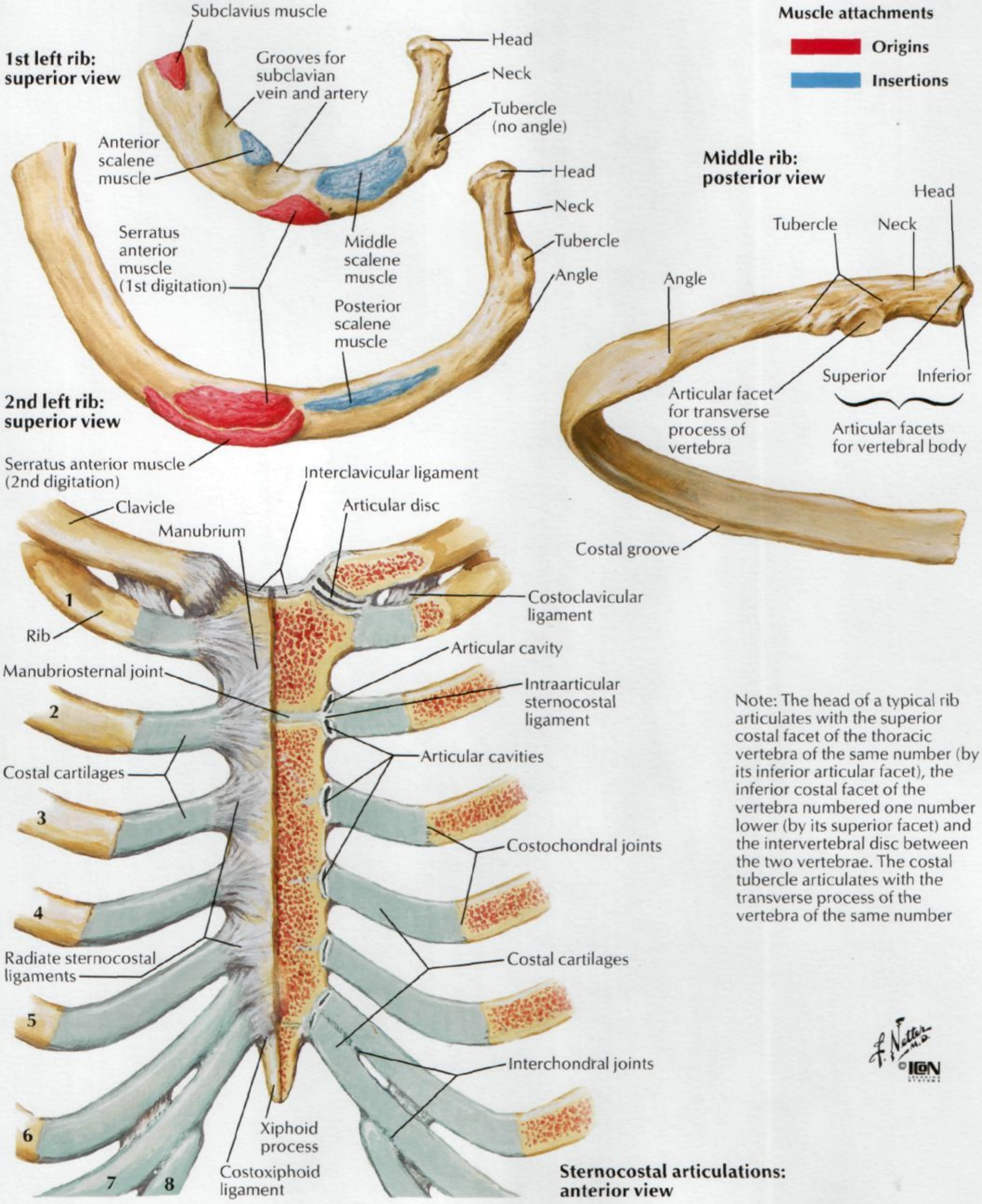
Anterior view



Posterior view



Ribs and Sternocostal Joints



1st left rib: superior view

2nd left rib: superior view

Middle rib: posterior view

Sternocostal articulations: anterior view

Muscle attachments

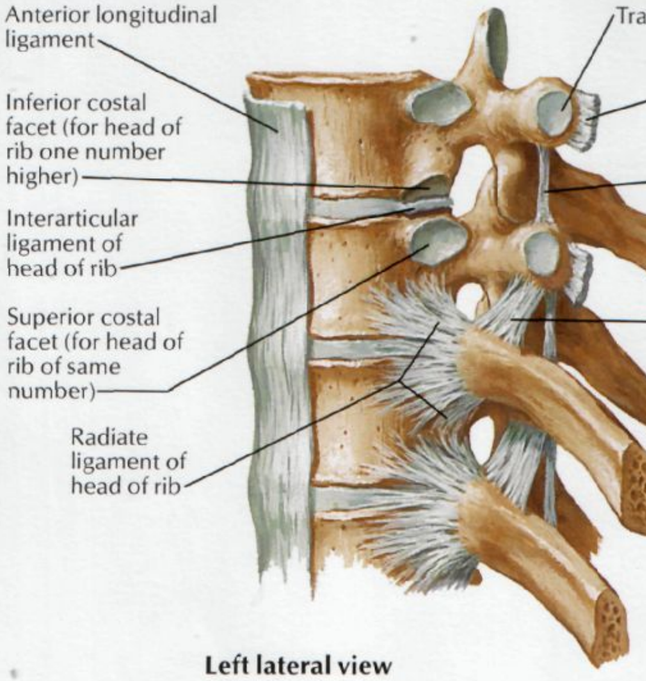
🟥 **Origins**

🟦 **Insertions**

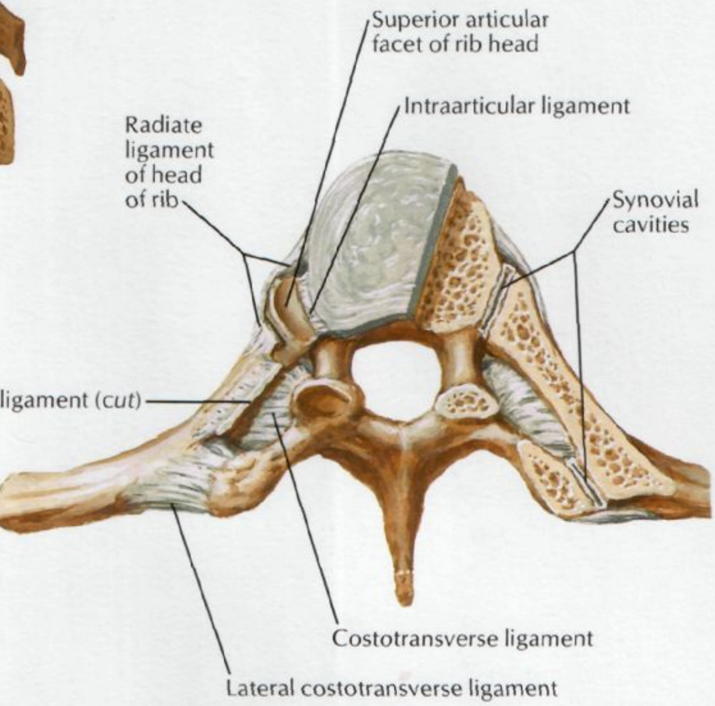
Note: The head of a typical rib articulates with the superior costal facet of the thoracic vertebra of the same number (by its inferior articular facet), the inferior costal facet of the vertebra numbered one number lower (by its superior facet) and the intervertebral disc between the two vertebrae. The costal tubercle articulates with the transverse process of the vertebra of the same number

Costovertebral Joints

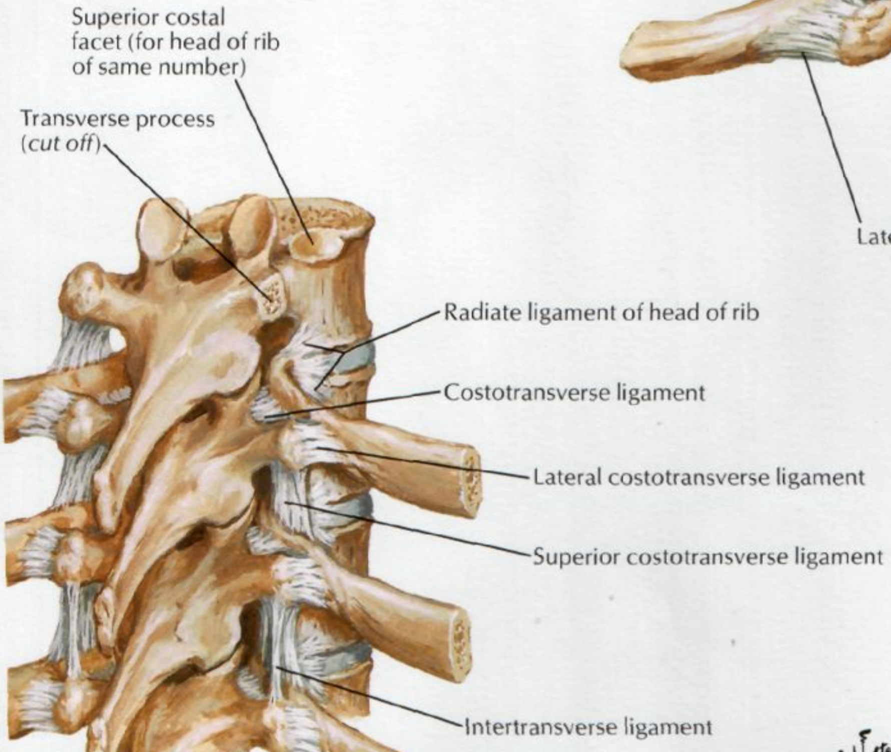
SEE ALSO PLATE 147


Anterior longitudinal ligament
Inferior costal facet (for head of rib one number higher)
Interarticular ligament of head of rib
Superior costal facet (for head of rib of same number)
Radiate ligament of head of rib
Transverse costal facet (for tubercle of rib of same number as vertebra)
Lateral costotransverse ligament
Intertransverse ligament
Superior costotransverse ligament

Left lateral view


Superior articular facet of rib head
Intraarticular ligament
Radiate ligament of head of rib
Synovial cavities
Superior costotransverse ligament (*cut*)
Costotransverse ligament
Lateral costotransverse ligament

Transverse section: superior view


Superior costal facet (for head of rib of same number)
Transverse process (*cut off*)
Radiate ligament of head of rib
Costotransverse ligament
Lateral costotransverse ligament
Superior costotransverse ligament
Intertransverse ligament

Right posterolateral view

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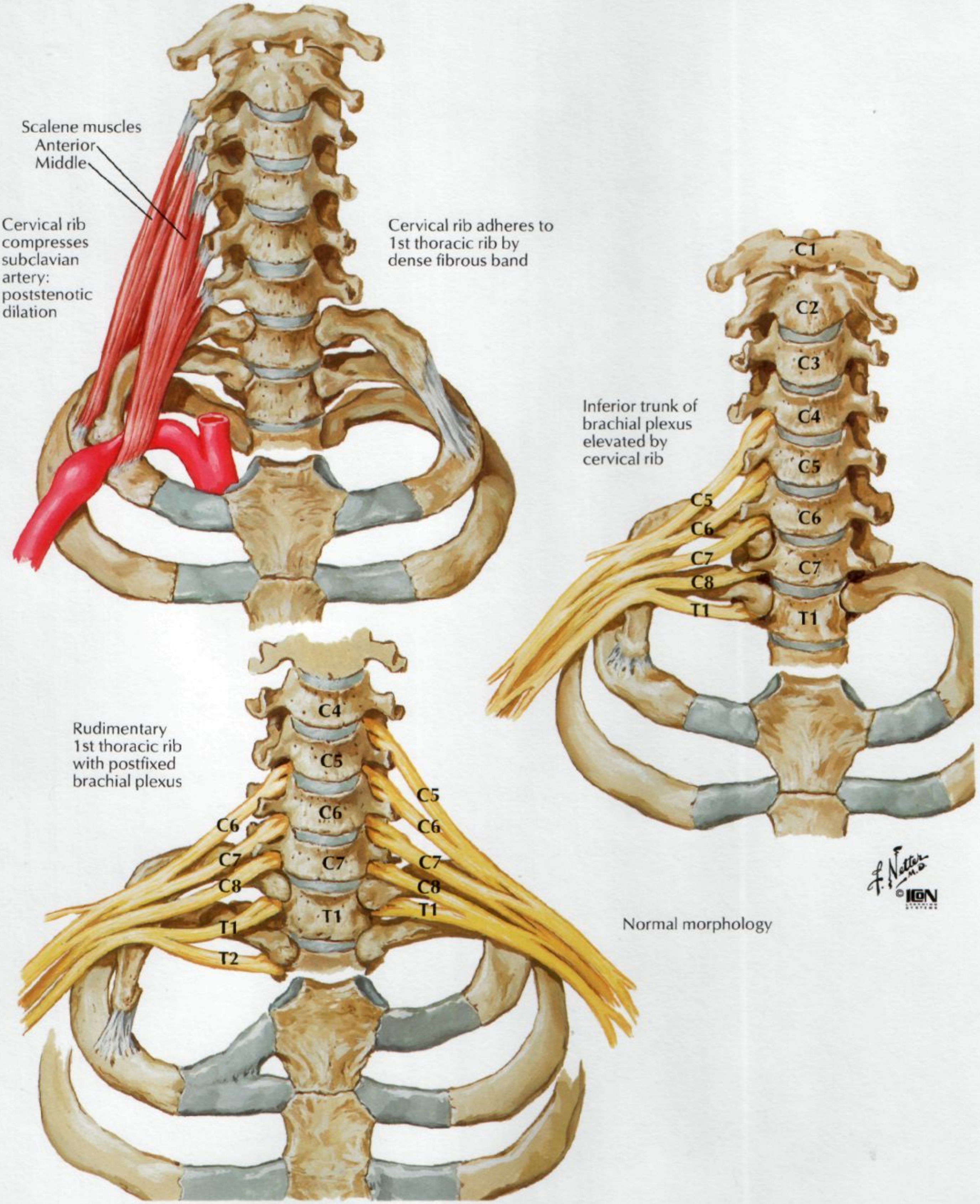
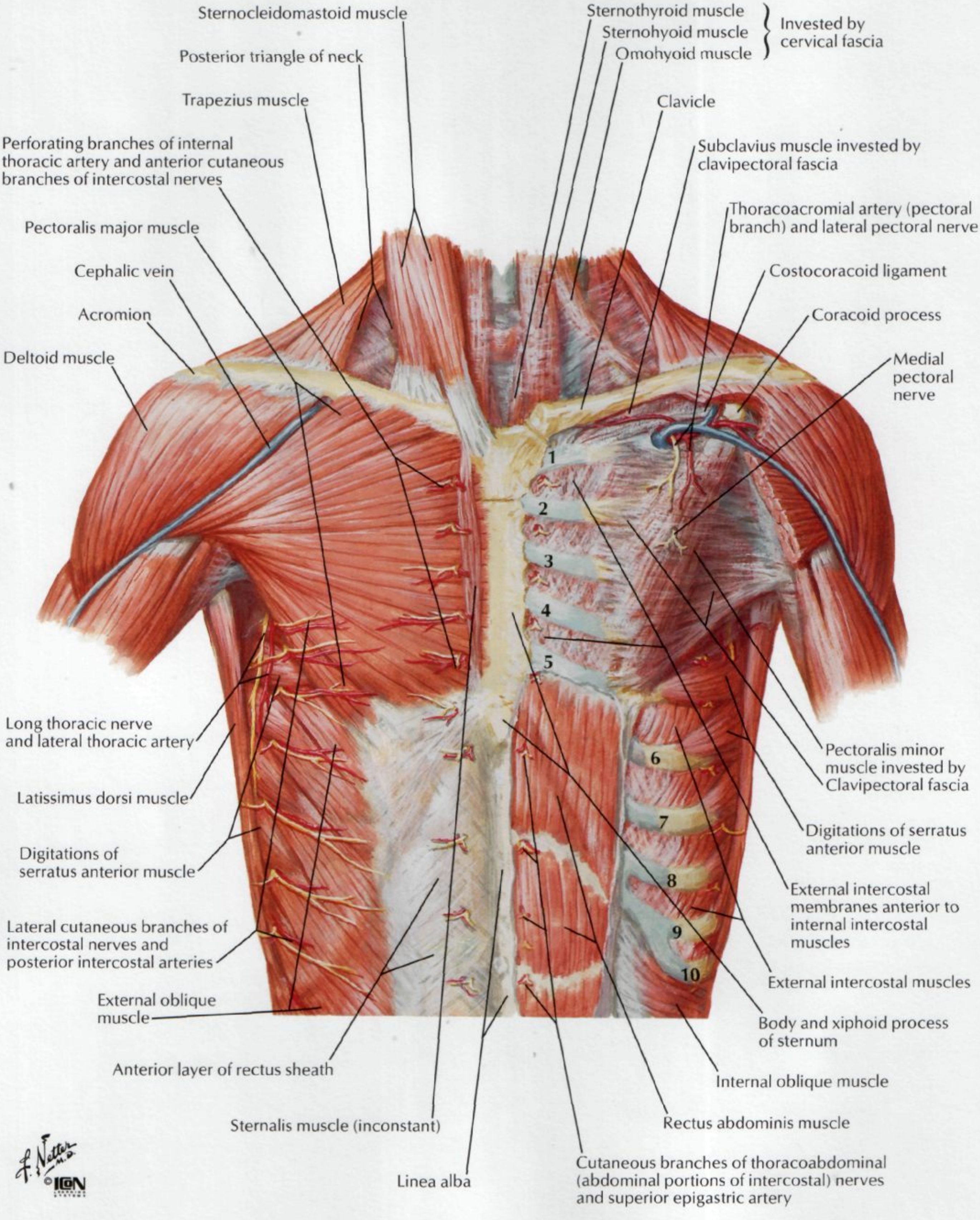
Cervical Ribs and Related Anomalies

SEE ALSO PLATES 29, 412, 413


Scalene muscles
Anterior
Middle
Cervical rib compresses subclavian artery: poststenotic dilation
Cervical rib adheres to 1st thoracic rib by dense fibrous band
C1
C2
C3
C4
C5
C6
C7
T1
Inferior trunk of brachial plexus elevated by cervical rib
C5
C6
C7
C8
T1
Normal morphology
Rudimentary 1st thoracic rib with postfixed brachial plexus
C4
C5
C6
C7
T1
C6
C7
C8
T1
T2
C5
C6
C7
C8
T1

Anterior Thoracic Wall



Sternocleidomastoid muscle
Posterior triangle of neck
Trapezius muscle
Perforating branches of internal thoracic artery and anterior cutaneous branches of intercostal nerves
Pectoralis major muscle
Cephalic vein
Acromion
Deltoid muscle
Long thoracic nerve and lateral thoracic artery
Latissimus dorsi muscle
Digitations of serratus anterior muscle
Lateral cutaneous branches of intercostal nerves and posterior intercostal arteries
External oblique muscle
Anterior layer of rectus sheath
Sternalis muscle (inconstant)
Linea alba
Sternothyroid muscle
Sternohyoid muscle
Omohyoid muscle
Invested by cervical fascia
Clavicle
Subclavius muscle invested by clavipectoral fascia
Thoracoacromial artery (pectoral branch) and lateral pectoral nerve
Costocoracoid ligament
Coracoid process
Medial pectoral nerve
Pectoralis minor muscle invested by Clavipectoral fascia
Digitations of serratus anterior muscle
External intercostal membranes anterior to internal intercostal muscles
External intercostal muscles
Body and xiphoid process of sternum
Internal oblique muscle
Rectus abdominis muscle
Cutaneous branches of thoracoabdominal (abdominal portions of intercostal) nerves and superior epigastric artery
1
2
3
4
5
6
7
8
9
10
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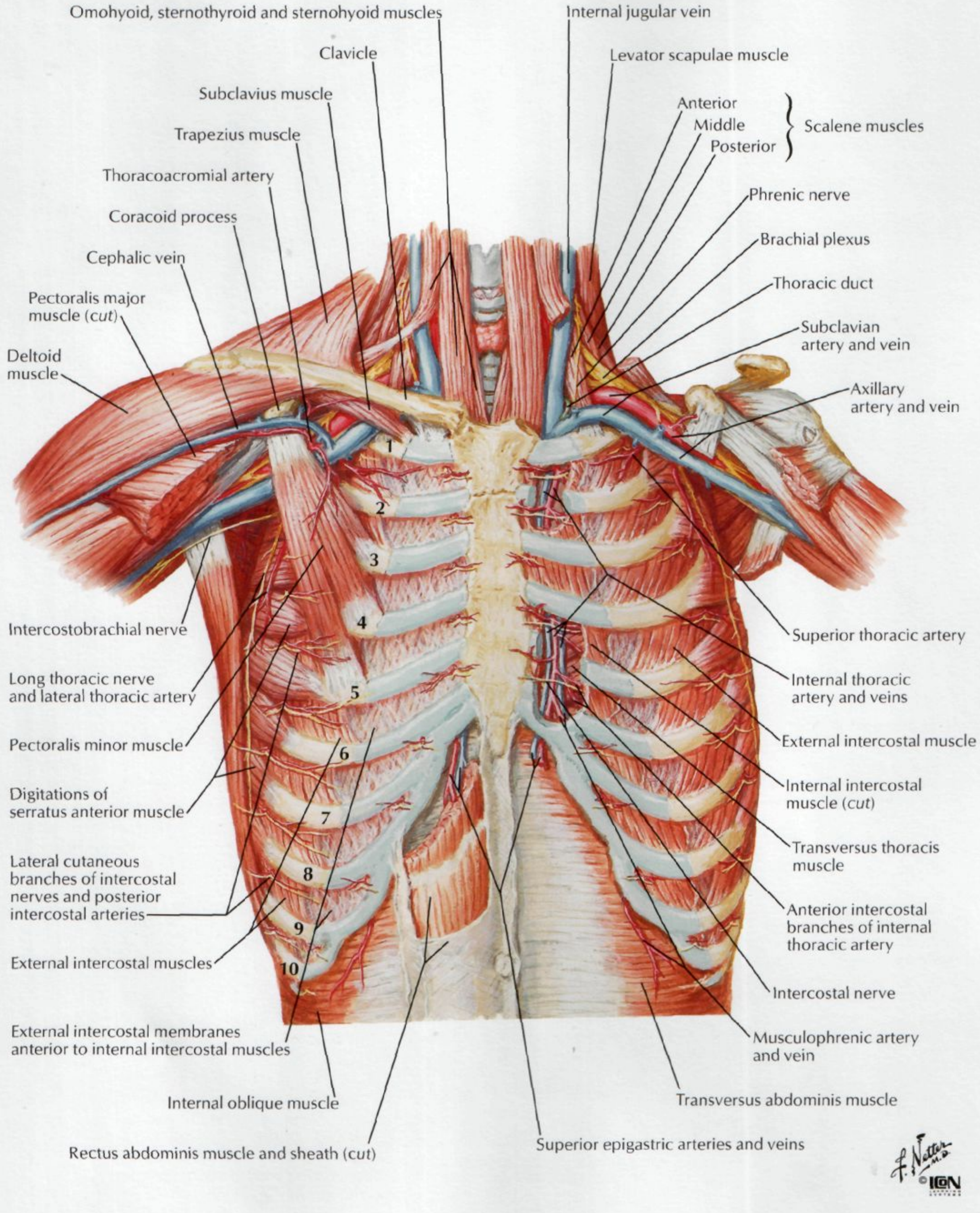
Anterior Thoracic Wall (continued)


Omohyoid, sternothyroid and sternohyoid muscles
Clavicle
Subclavius muscle
Trapezius muscle
Thoracoacromial artery
Coracoid process
Cephalic vein
Pectoralis major muscle (*cut*)
Deltoid muscle
Intercostobrachial nerve
Long thoracic nerve and lateral thoracic artery
Pectoralis minor muscle
Digitations of serratus anterior muscle
Lateral cutaneous branches of intercostal nerves and posterior intercostal arteries
External intercostal muscles
External intercostal membranes anterior to internal intercostal muscles
Internal oblique muscle
Rectus abdominis muscle and sheath (cut)
Internal jugular vein
Levator scapulae muscle
Anterior
Middle
Posterior
Scalene muscles
Phrenic nerve
Brachial plexus
Thoracic duct
Subclavian artery and vein
Axillary artery and vein
Superior thoracic artery
Internal thoracic artery and veins
External intercostal muscle
Internal intercostal muscle (*cut*)
Transversus thoracis muscle
Anterior intercostal branches of internal thoracic artery
Intercostal nerve
Musculophrenic artery and vein
Transversus abdominis muscle
Superior epigastric arteries and veins
1
2
3
4
5
6
7
8
9
10
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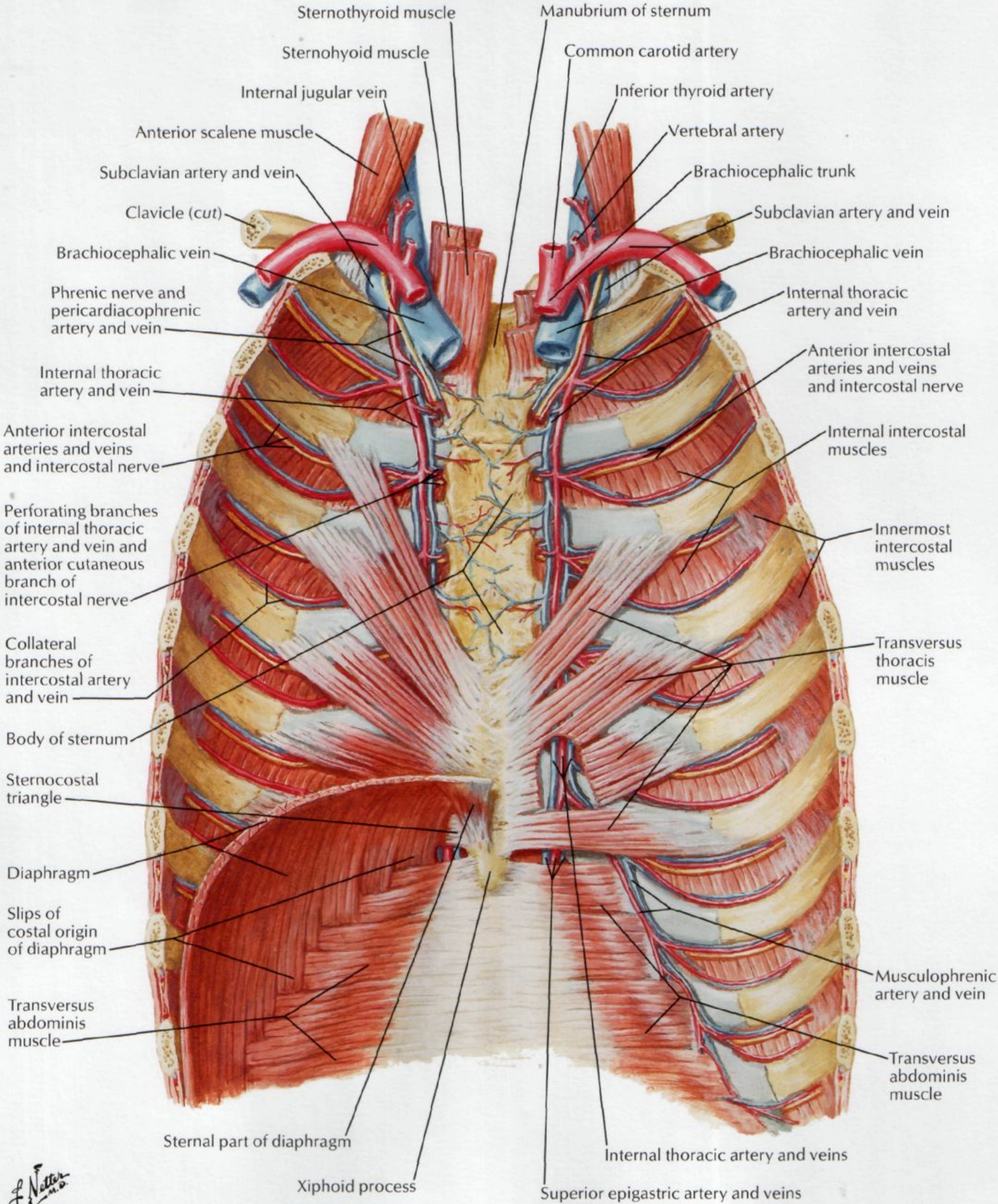
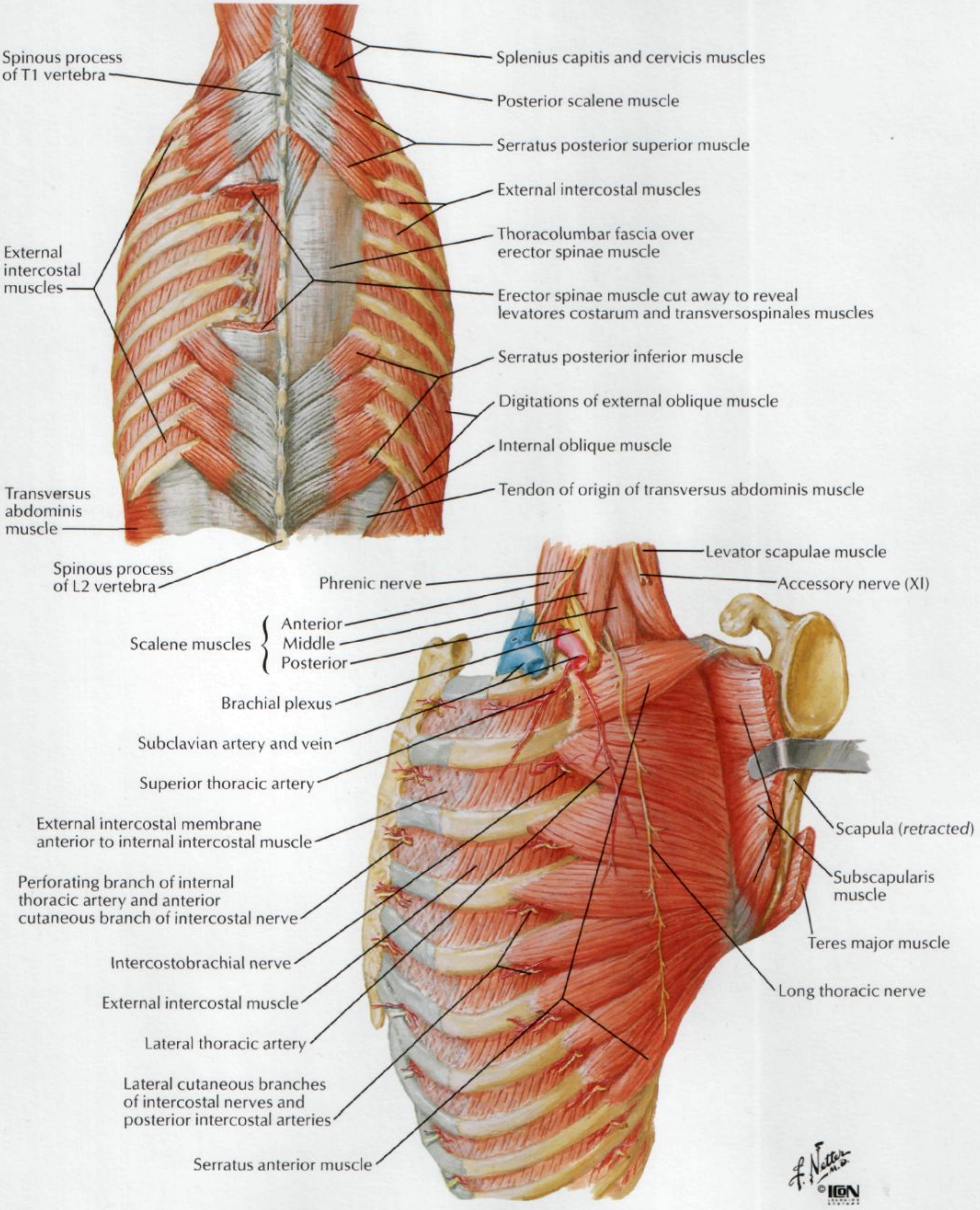
Anterior Thoracic Wall: Internal View


Sternothyroid muscle
Sternohyoid muscle
Internal jugular vein
Anterior scalene muscle
Subclavian artery and vein
Clavicle (*cut*)
Brachiocephalic vein
Phrenic nerve and pericardiacophrenic artery and vein
Internal thoracic artery and vein
Anterior intercostal arteries and veins and intercostal nerve
Perforating branches of internal thoracic artery and vein and anterior cutaneous branch of intercostal nerve
Collateral branches of intercostal artery and vein
Body of sternum
Sternocostal triangle
Diaphragm
Slips of costal origin of diaphragm
Transversus abdominis muscle
Sternal part of diaphragm
Xiphoid process
Manubrium of sternum
Common carotid artery
Inferior thyroid artery
Vertebral artery
Brachiocephalic trunk
Subclavian artery and vein
Brachiocephalic vein
Internal thoracic artery and vein
Anterior intercostal arteries and veins and intercostal nerve
Internal intercostal muscles
Innermost intercostal muscles
Transversus thoracis muscle
Musculophrenic artery and vein
Transversus abdominis muscle
Internal thoracic artery and veins
Superior epigastric artery and veins

Posterior and Lateral Thoracic Walls

SEE ALSO PLATES 167–169


Spinous process of T1 vertebra
Splenius capitis and cervicis muscles
Posterior scalene muscle
Serratus posterior superior muscle
External intercostal muscles
Thoracolumbar fascia over erector spinae muscle
External intercostal muscles
Erector spinae muscle cut away to reveal levatores costarum and transversospinales muscles
Serratus posterior inferior muscle
Digitations of external oblique muscle
Internal oblique muscle
Transversus abdominis muscle
Tendon of origin of transversus abdominis muscle
Spinous process of L2 vertebra
Levator scapulae muscle
Phrenic nerve
Accessory nerve (XI)
Scalene muscles
Anterior
Middle
Posterior
Brachial plexus
Subclavian artery and vein
Superior thoracic artery
External intercostal membrane anterior to internal intercostal muscle
Scapula (retracted)
Perforating branch of internal thoracic artery and anterior cutaneous branch of intercostal nerve
Subscapularis muscle
Teres major muscle
Intercostobrachial nerve
Long thoracic nerve
External intercostal muscle
Lateral thoracic artery
Lateral cutaneous branches of intercostal nerves and posterior intercostal arteries
Serratus anterior muscle
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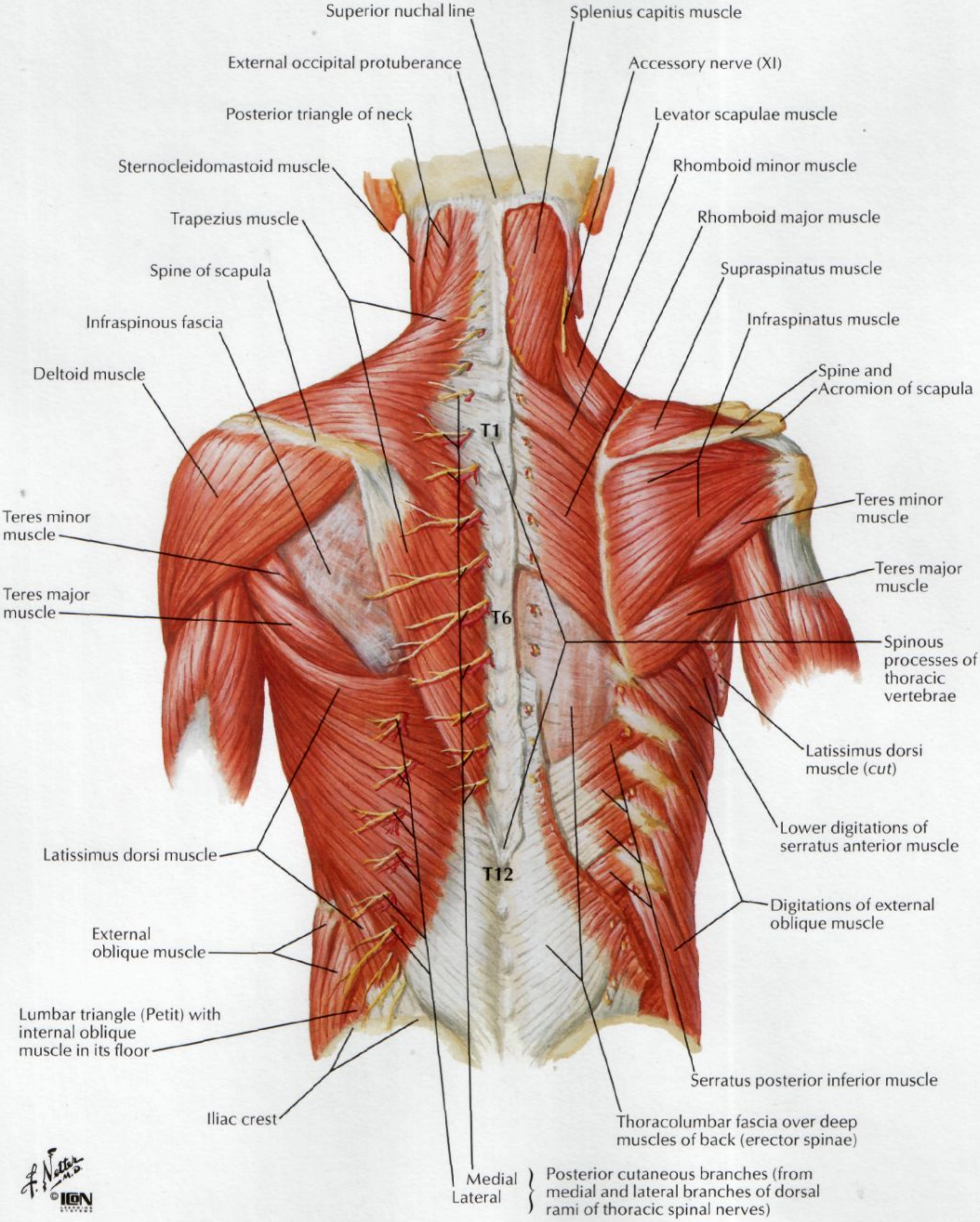
Posterior Thoracic Wall


Superior nuchal line
External occipital protuberance
Posterior triangle of neck
Sternocleidomastoid muscle
Trapezius muscle
Spine of scapula
Infraspinous fascia
Deltoid muscle
Teres minor muscle
Teres major muscle
Latissimus dorsi muscle
External oblique muscle
Lumbar triangle (Petit) with internal oblique muscle in its floor
Iliac crest
Splenius capitis muscle
Accessory nerve (XI)
Levator scapulae muscle
Rhomboid minor muscle
Rhomboid major muscle
Supraspinatus muscle
Infraspinatus muscle
Spine and Acromion of scapula
Teres minor muscle
Teres major muscle
Spinous processes of thoracic vertebrae
Latissimus dorsi muscle (*cut*)
Lower digitations of serratus anterior muscle
Digitations of external oblique muscle
Serratus posterior inferior muscle
Thoracolumbar fascia over deep muscles of back (erector spinae)
T1
T6
T12
Medial
Lateral
Posterior cutaneous branches (from medial and lateral branches of dorsal rami of thoracic spinal nerves)
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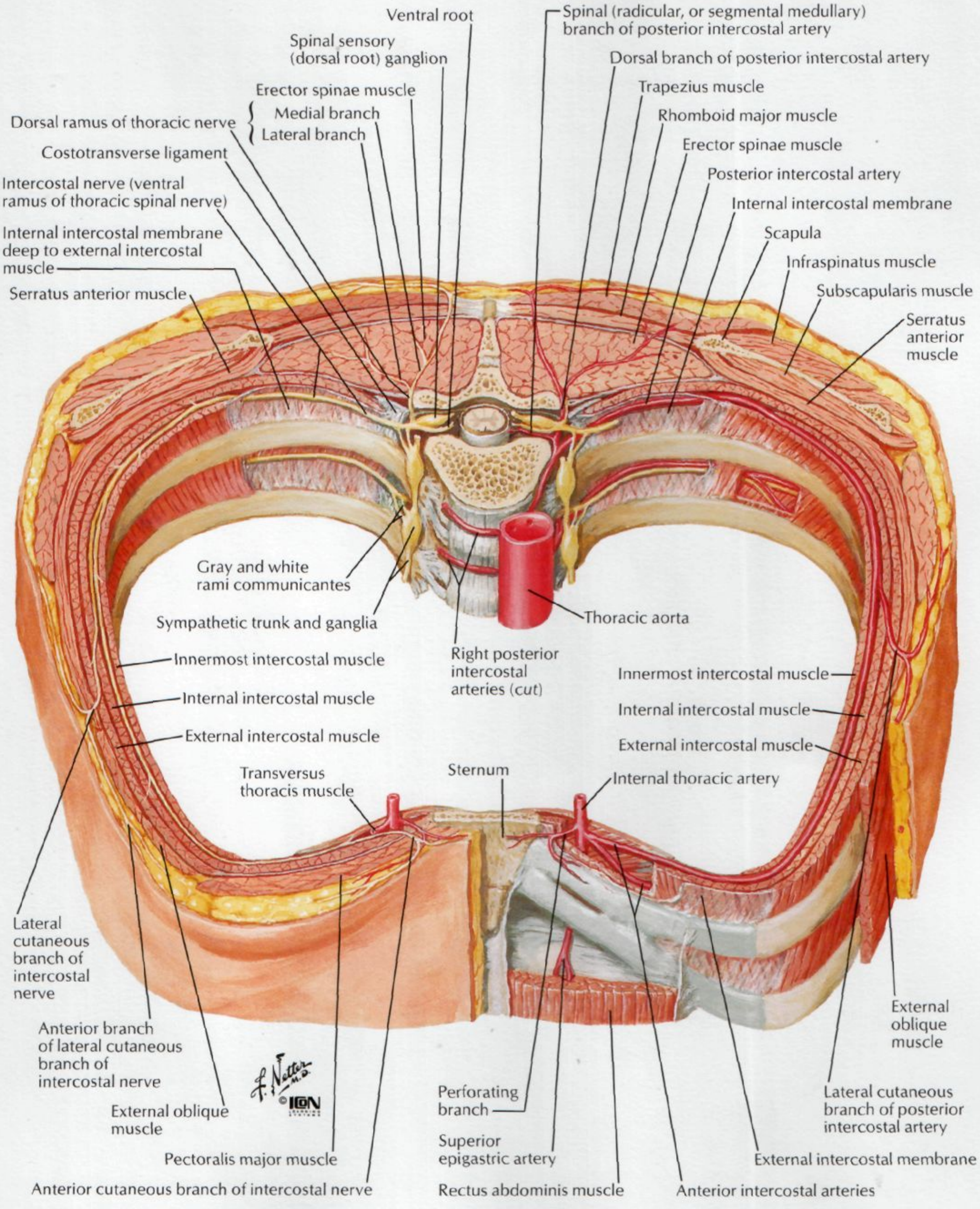
Intercostal Nerves and Arteries

SEE ALSO PLATES 173, 250


Ventral root
Spinal sensory (dorsal root) ganglion
Erector spinae muscle
Dorsal ramus of thoracic nerve
Medial branch
Lateral branch
Costotransverse ligament
Intercostal nerve (ventral ramus of thoracic spinal nerve)
Internal intercostal membrane deep to external intercostal muscle
Serratus anterior muscle
Spinal (radicular, or segmental medullary) branch of posterior intercostal artery
Dorsal branch of posterior intercostal artery
Trapezius muscle
Rhomboid major muscle
Erector spinae muscle
Posterior intercostal artery
Internal intercostal membrane
Scapula
Infraspinatus muscle
Subscapularis muscle
Serratus anterior muscle
Gray and white rami communicantes
Sympathetic trunk and ganglia
Thoracic aorta
Right posterior intercostal arteries (*cut*)
Innermost intercostal muscle
Internal intercostal muscle
External intercostal muscle
Innermost intercostal muscle
Internal intercostal muscle
External intercostal muscle
Transversus thoracis muscle
Sternum
Internal thoracic artery
Lateral cutaneous branch of intercostal nerve
Anterior branch of lateral cutaneous branch of intercostal nerve
External oblique muscle
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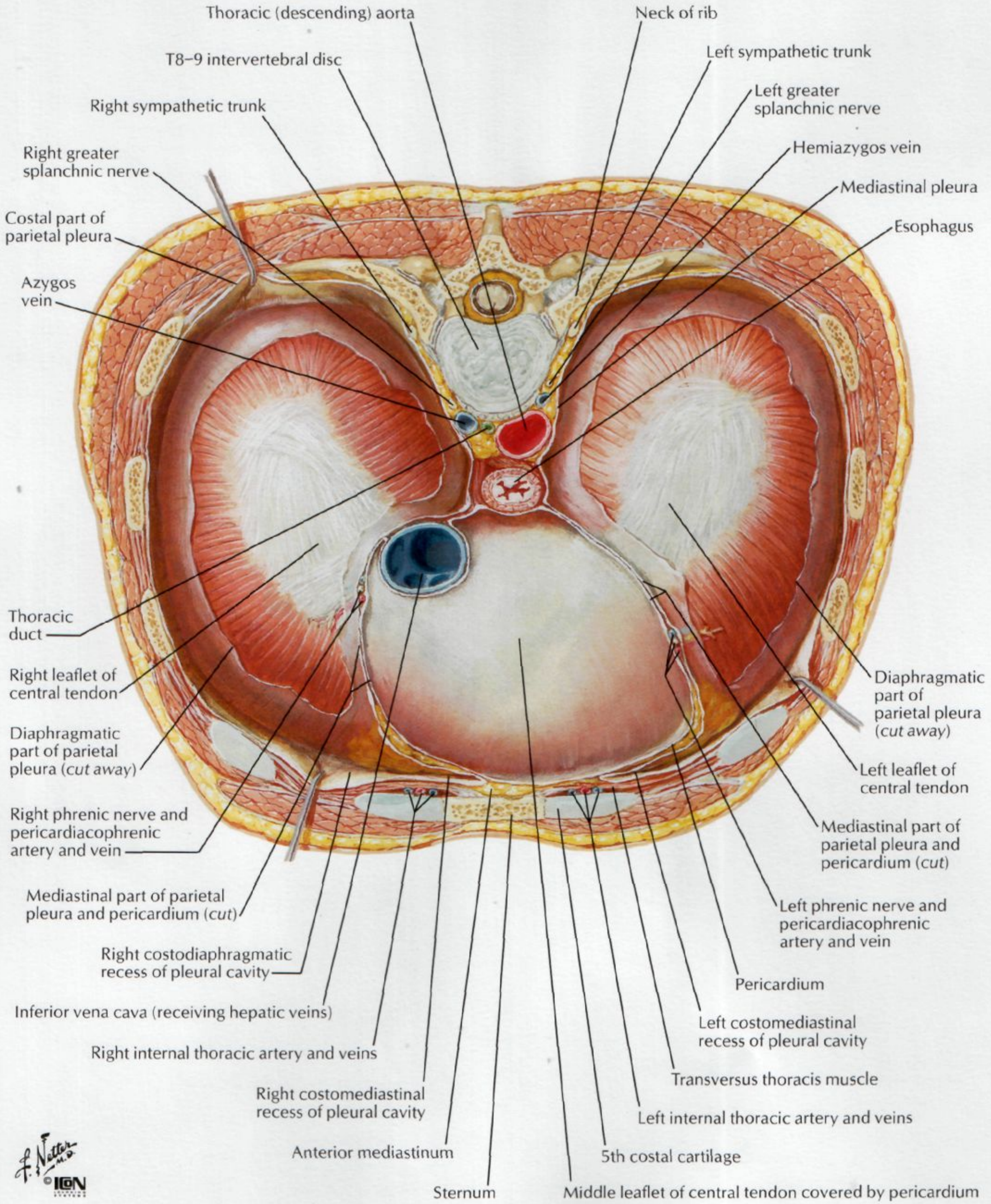
Pectoralis major muscle
Anterior cutaneous branch of intercostal nerve
Perforating branch
Superior epigastric artery
Rectus abdominis muscle
Anterior intercostal arteries
External intercostal membrane
Lateral cutaneous branch of posterior intercostal artery
External oblique muscle

Diaphragm: Thoracic Surface

SEE ALSO PLATES 226, 227



Thoracic (descending) aorta
Neck of rib
T8–9 intervertebral disc
Left sympathetic trunk
Right sympathetic trunk
Left greater splanchnic nerve
Right greater splanchnic nerve
Hemiazygos vein
Mediastinal pleura
Costal part of parietal pleura
Esophagus
Azygos vein
Thoracic duct
Right leaflet of central tendon
Diaphragmatic part of parietal pleura (*cut away*)
Diaphragmatic part of parietal pleura (*cut away*)
Left leaflet of central tendon
Right phrenic nerve and pericardiacophrenic artery and vein
Mediastinal part of parietal pleura and pericardium (*cut*)
Mediastinal part of parietal pleura and pericardium (*cut*)
Left phrenic nerve and pericardiacophrenic artery and vein
Right costodiaphragmatic recess of pleural cavity
Pericardium
Inferior vena cava (receiving hepatic veins)
Left costomediastinal recess of pleural cavity
Right internal thoracic artery and veins
Transversus thoracis muscle
Right costomediastinal recess of pleural cavity
Left internal thoracic artery and veins
Anterior mediastinum
5th costal cartilage
Sternum
Middle leaflet of central tendon covered by pericardium

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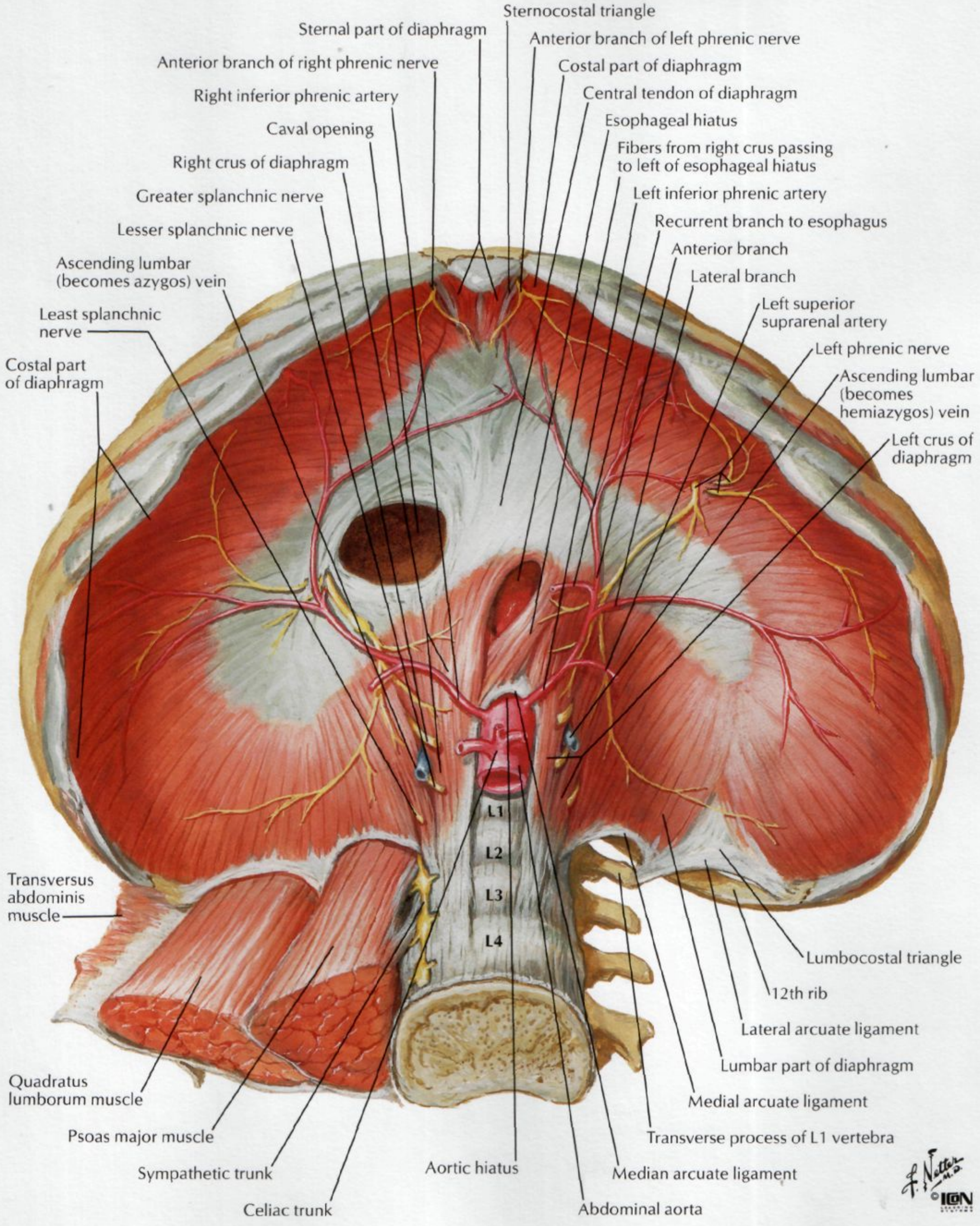
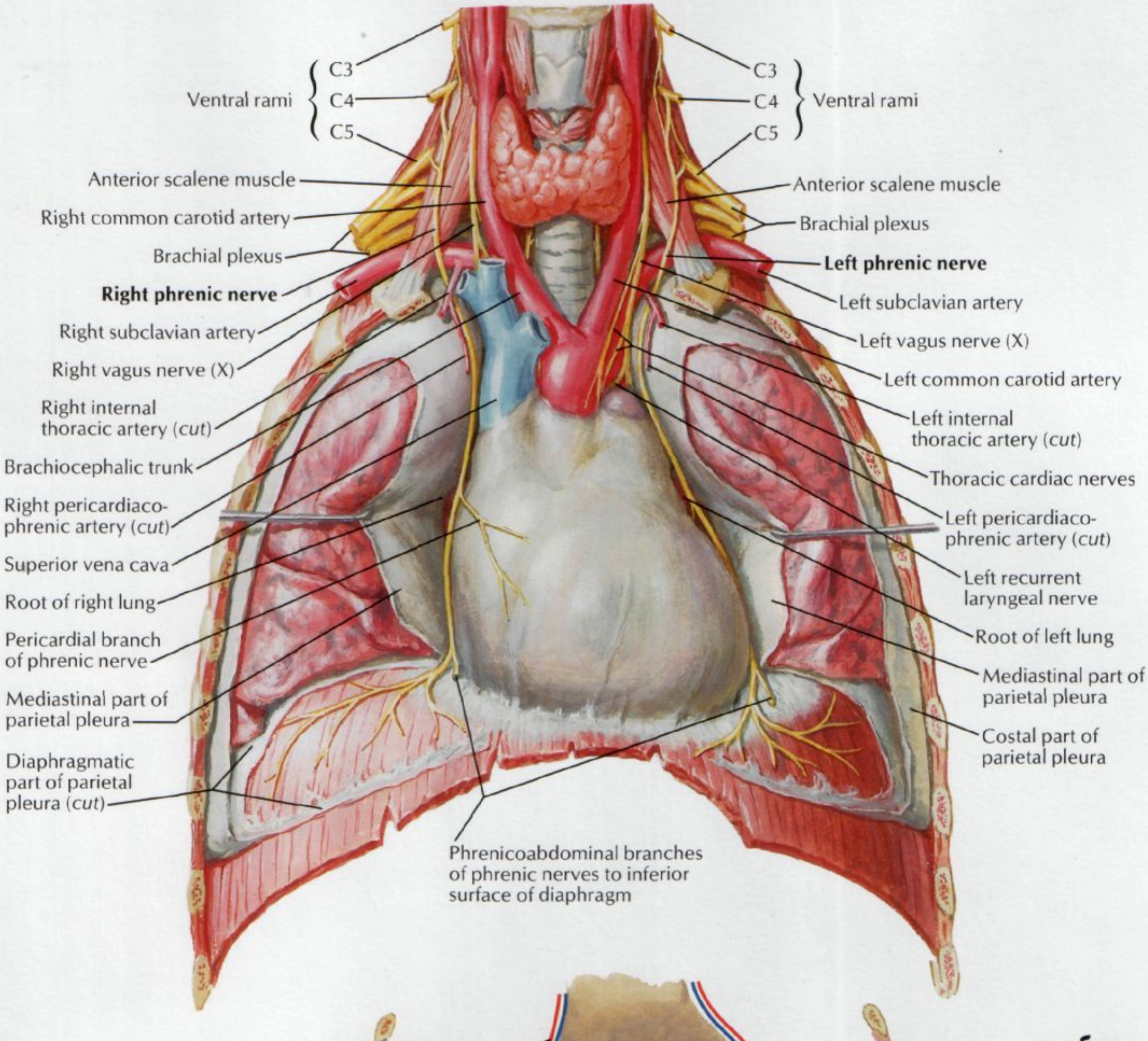
Diaphragm: Abdominal Surface

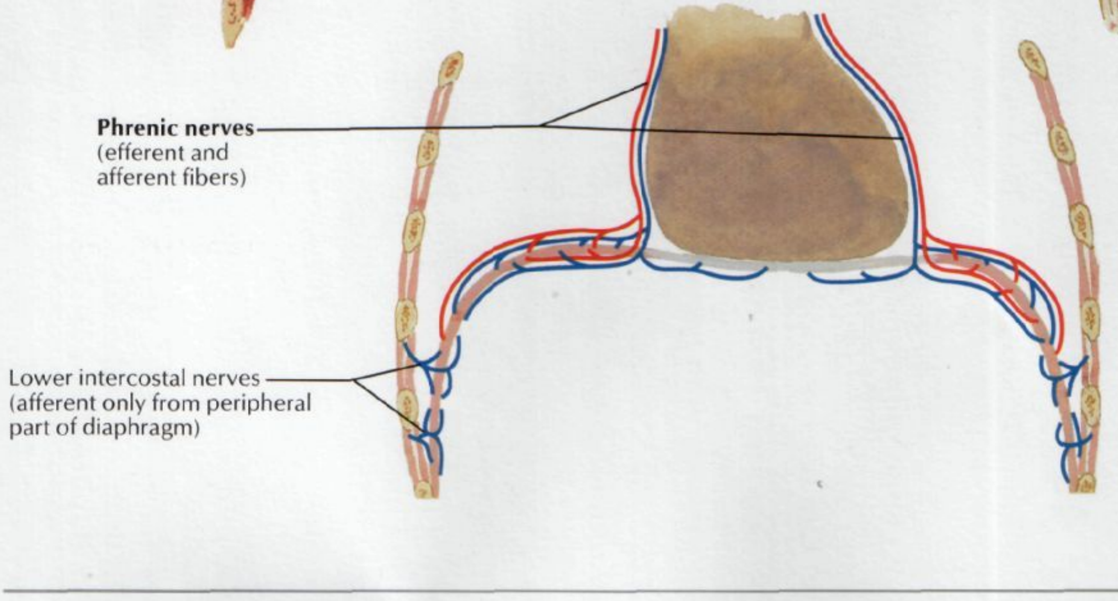
SEE ALSO PLATES 245, 255, 262



Phrenic Nerve

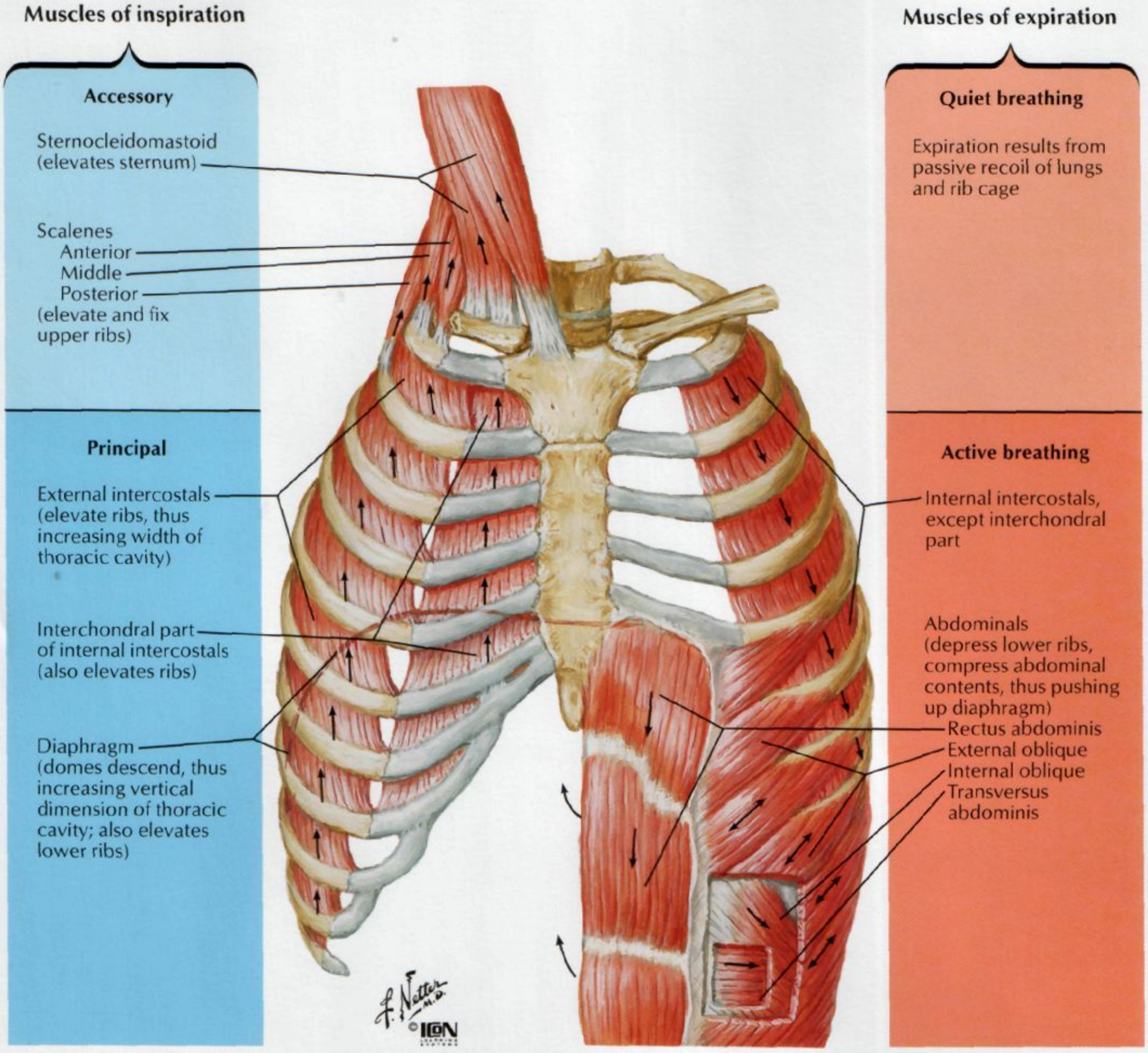
SEE ALSO PLATES 28, 123


Ventral rami
C3
C4
C5
Anterior scalene muscle
Right common carotid artery
Brachial plexus
Right phrenic nerve
Right subclavian artery
Right vagus nerve (X)
Right internal thoracic artery (*cut*)
Brachiocephalic trunk
Right pericardiacophrenic artery (*cut*)
Superior vena cava
Root of right lung
Pericardial branch of phrenic nerve
Mediastinal part of parietal pleura
Diaphragmatic part of parietal pleura (*cut*)
C3
C4
C5
Ventral rami
Anterior scalene muscle
Brachial plexus
Left phrenic nerve
Left subclavian artery
Left vagus nerve (X)
Left common carotid artery
Left internal thoracic artery (*cut*)
Thoracic cardiac nerves
Left pericardiacophrenic artery (*cut*)
Left recurrent laryngeal nerve
Root of left lung
Mediastinal part of parietal pleura
Costal part of parietal pleura
Phrenicoabdominal branches of phrenic nerves to inferior surface of diaphragm


Phrenic nerves (efferent and afferent fibers)
Lower intercostal nerves (afferent only from peripheral part of diaphragm)

Muscles of Respiration

FOR ADDITIONAL MUSCLES OF INSPIRATION SEE PLATES 169, 185


Muscles of inspiration
Accessory
Sternocleidomastoid (elevates sternum)
Scalenes
Anterior
Middle
Posterior
(elevate and fix upper ribs)
Principal
External intercostals (elevate ribs, thus increasing width of thoracic cavity)
Interchondral part of internal intercostals (also elevates ribs)
Diaphragm (domes descend, thus increasing vertical dimension of thoracic cavity; also elevates lower ribs)
Muscles of expiration
Quiet breathing
Expiration results from passive recoil of lungs and rib cage
Active breathing
Internal intercostals, except interchondral part
Abdominals (depress lower ribs, compress abdominal contents, thus pushing up diaphragm)
Rectus abdominis
External oblique
Internal oblique
Transversus abdominis
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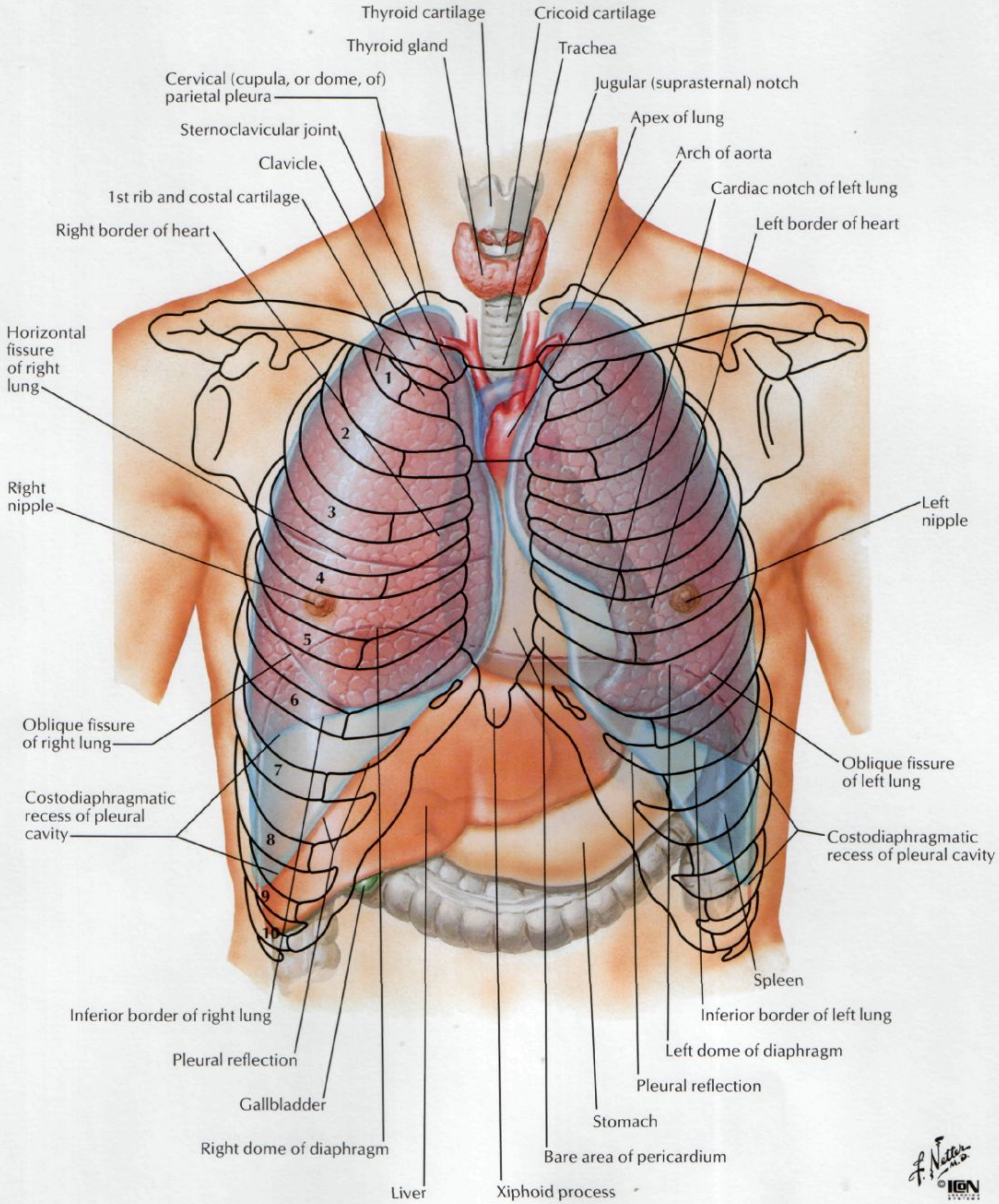
Topography of Lungs: Anterior View


Thyroid cartilage
Cricoid cartilage
Thyroid gland
Trachea
Cervical (cupula, or dome, of) parietal pleura
Jugular (suprasternal) notch
Apex of lung
Sternoclavicular joint
Arch of aorta
Clavicle
Cardiac notch of left lung
1st rib and costal cartilage
Left border of heart
Right border of heart
Horizontal fissure of right lung
Right nipple
Left nipple
1
2
3
4
5
6
7
8
9
10
Oblique fissure of right lung
Oblique fissure of left lung
Costodiaphragmatic recess of pleural cavity
Costodiaphragmatic recess of pleural cavity
Spleen
Inferior border of right lung
Inferior border of left lung
Left dome of diaphragm
Pleural reflection
Pleural reflection
Gallbladder
Stomach
Right dome of diaphragm
Bare area of pericardium
Liver
Xiphoid process
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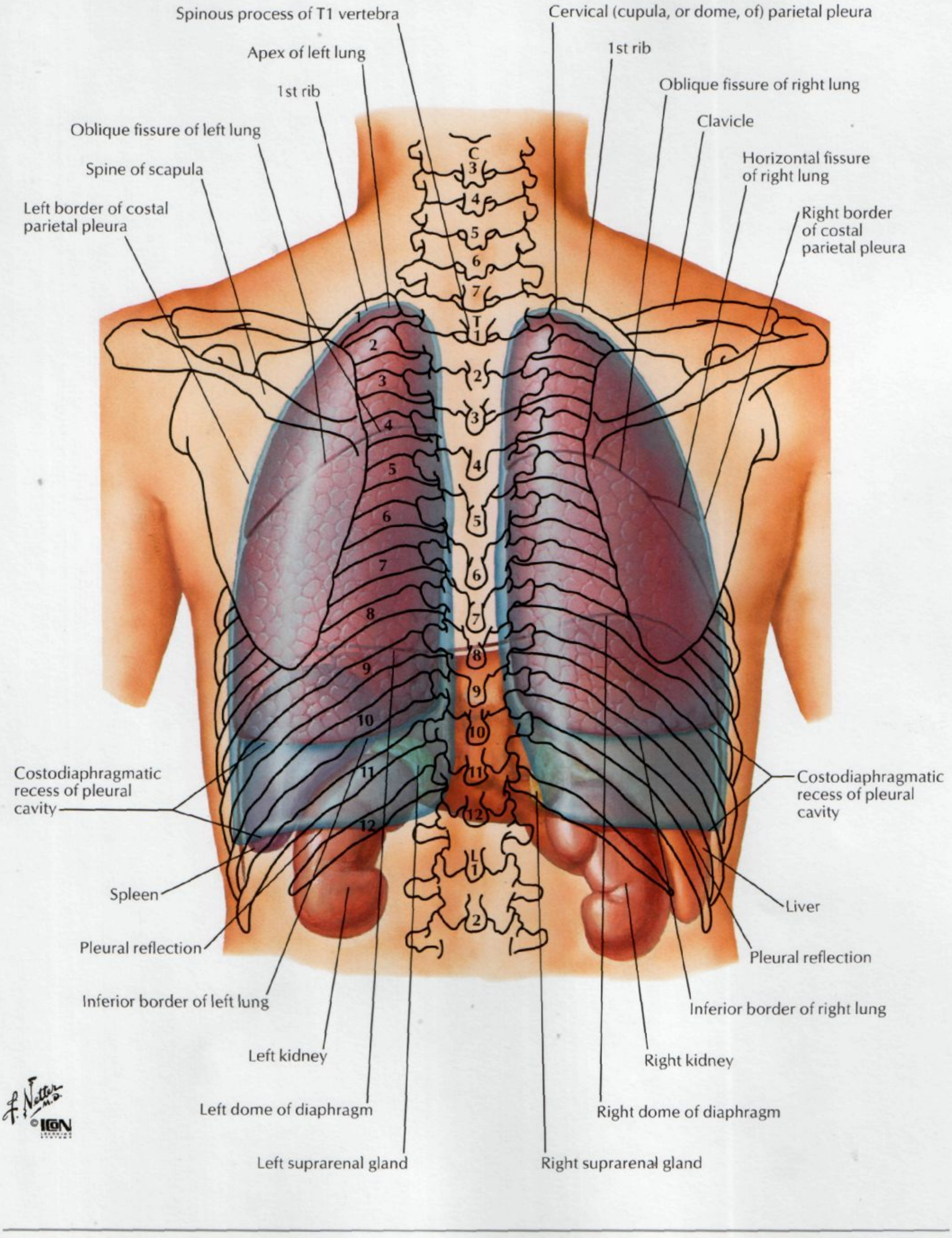
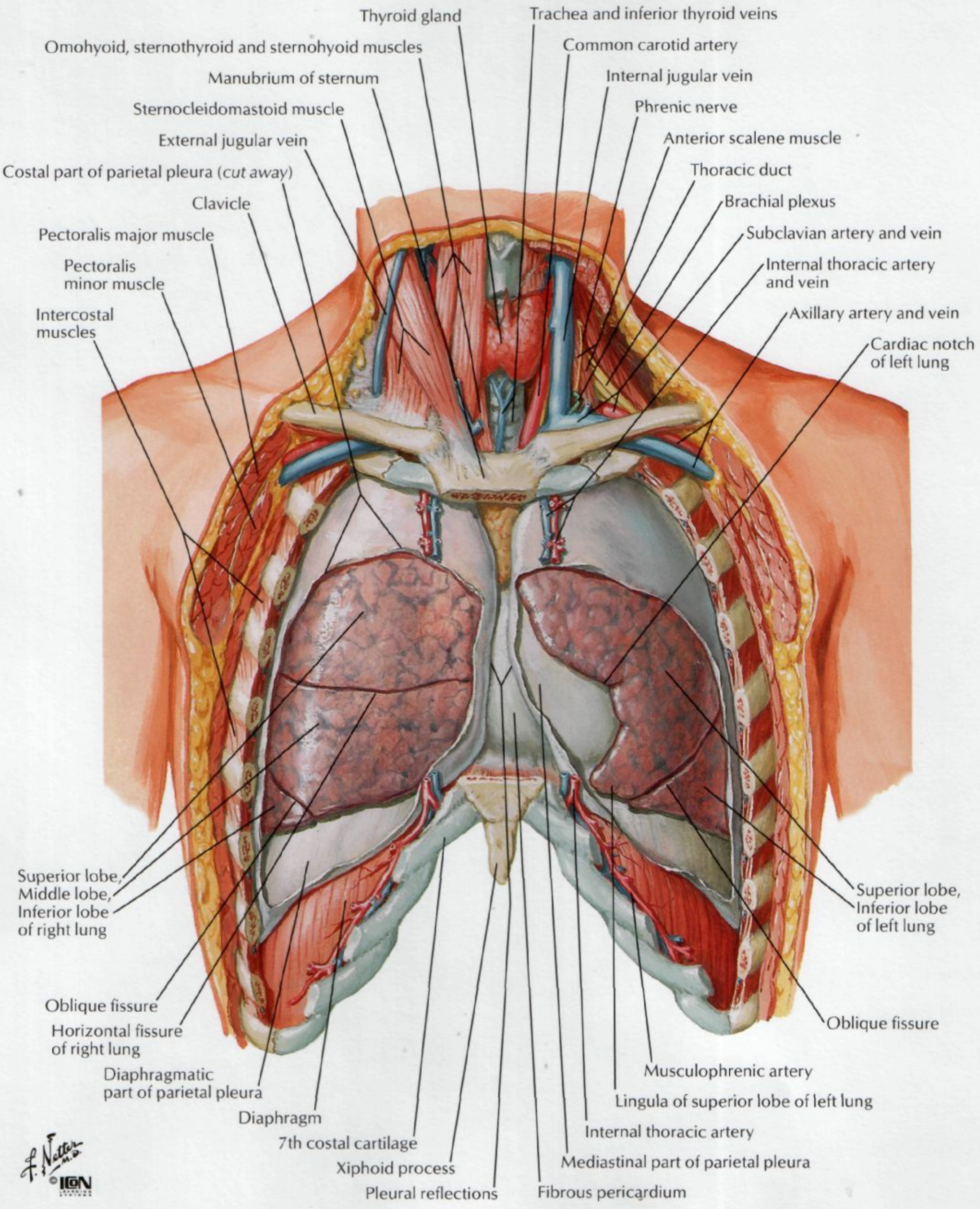
Topography of Lungs: Posterior View


Spinous process of T1 vertebra
Cervical (cupula, or dome, of) parietal pleura
Apex of left lung
1st rib
1st rib
Oblique fissure of right lung
Oblique fissure of left lung
Clavicle
Spine of scapula
Horizontal fissure of right lung
Left border of costal parietal pleura
Right border of costal parietal pleura
Costodiaphragmatic recess of pleural cavity
Costodiaphragmatic recess of pleural cavity
Spleen
Liver
Pleural reflection
Pleural reflection
Inferior border of left lung
Inferior border of right lung
Left kidney
Right kidney
Left dome of diaphragm
Right dome of diaphragm
Left suprarenal gland
Right suprarenal gland
C 3
4
5
6
7
T 1
2
3
4
5
6
7
8
9
10
11
12
L 1
2
1
2
3
4
5
6
7
8
9
10
11
12
F. Netter M.D.

Lungs In Situ: Anterior View


Thyroid gland
Trachea and inferior thyroid veins
Omohyoid, sternothyroid and sternohyoid muscles
Common carotid artery
Manubrium of sternum
Internal jugular vein
Sternocleidomastoid muscle
Phrenic nerve
External jugular vein
Anterior scalene muscle
Costal part of parietal pleura (*cut away*)
Thoracic duct
Clavicle
Brachial plexus
Pectoralis major muscle
Subclavian artery and vein
Pectoralis minor muscle
Internal thoracic artery and vein
Intercostal muscles
Axillary artery and vein
Cardiac notch of left lung
Superior lobe, Middle lobe, Inferior lobe of right lung
Superior lobe, Inferior lobe of left lung
Oblique fissure
Oblique fissure
Horizontal fissure of right lung
Musculophrenic artery
Diaphragmatic part of parietal pleura
Lingula of superior lobe of left lung
Diaphragm
Internal thoracic artery
7th costal cartilage
Mediastinal part of parietal pleura
Xiphoid process
Pleural reflections
Fibrous pericardium
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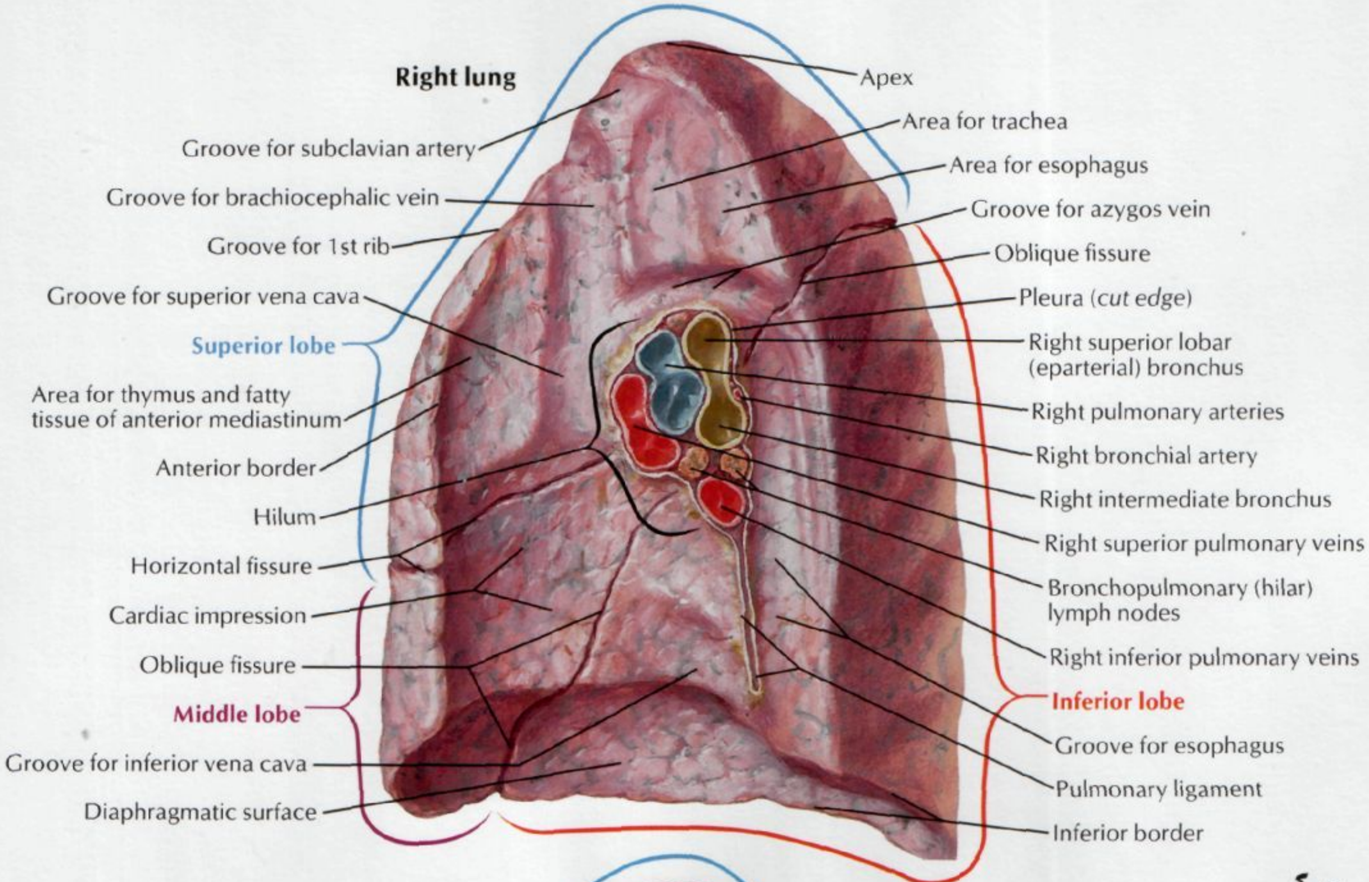
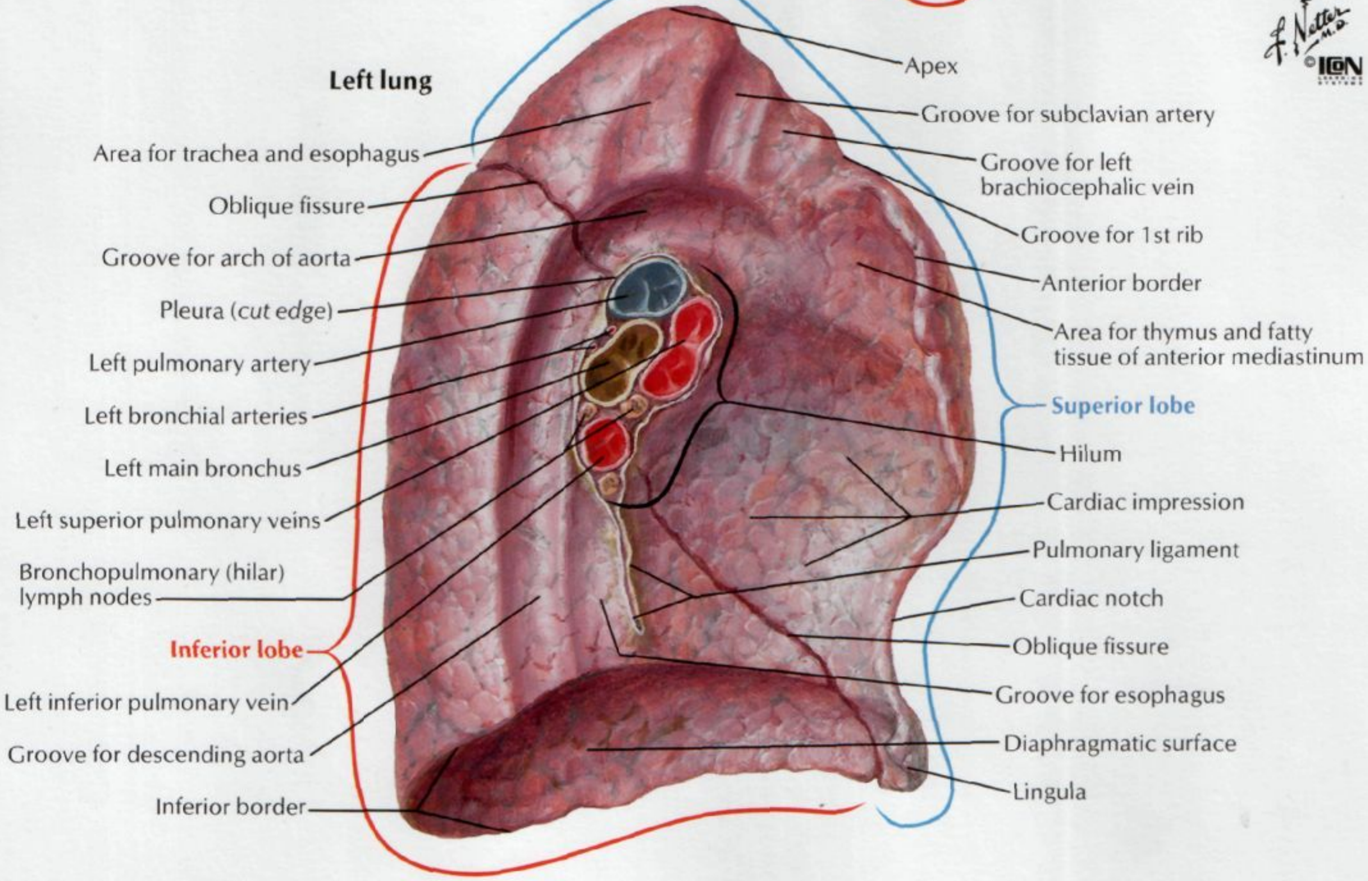
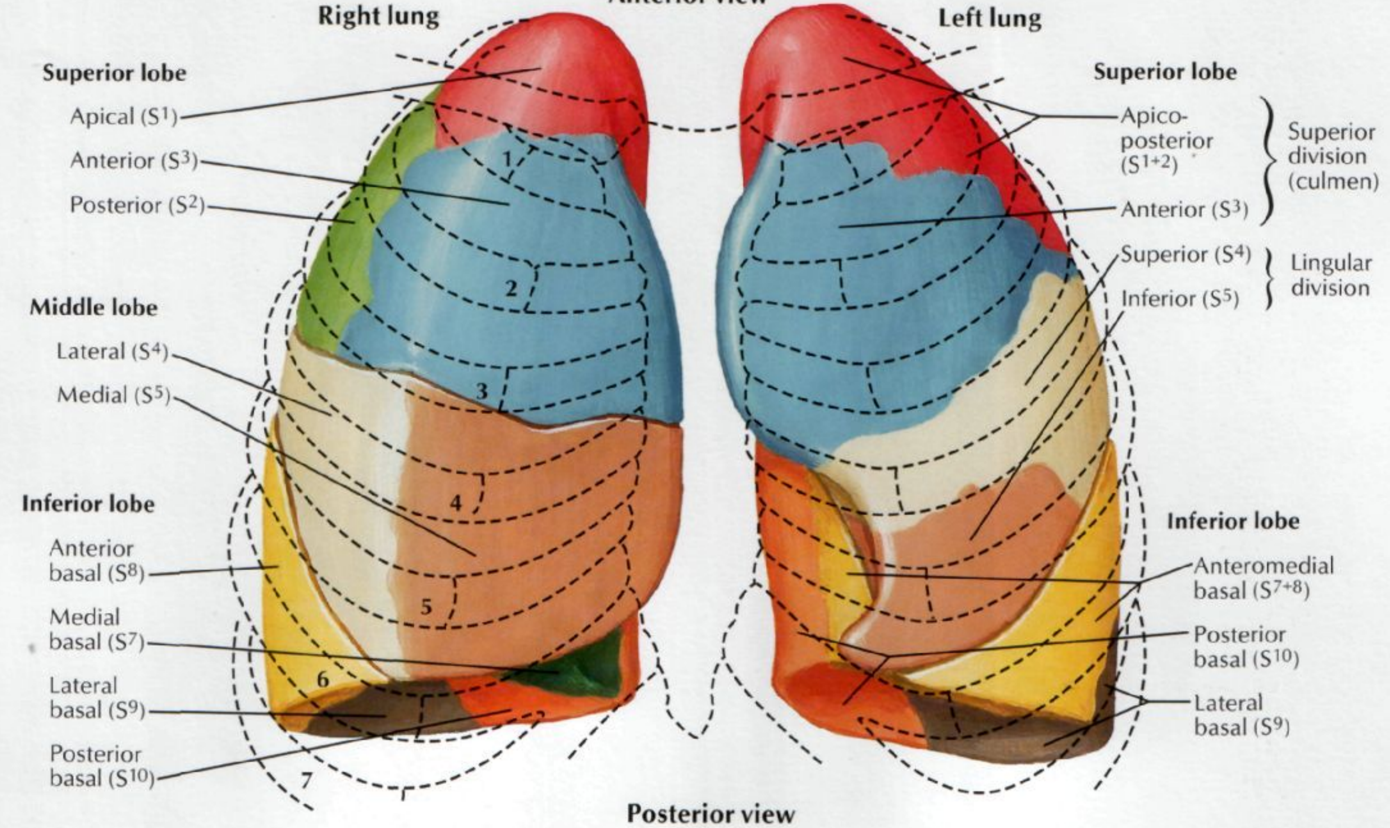
Lungs: Medial Views


Right lung

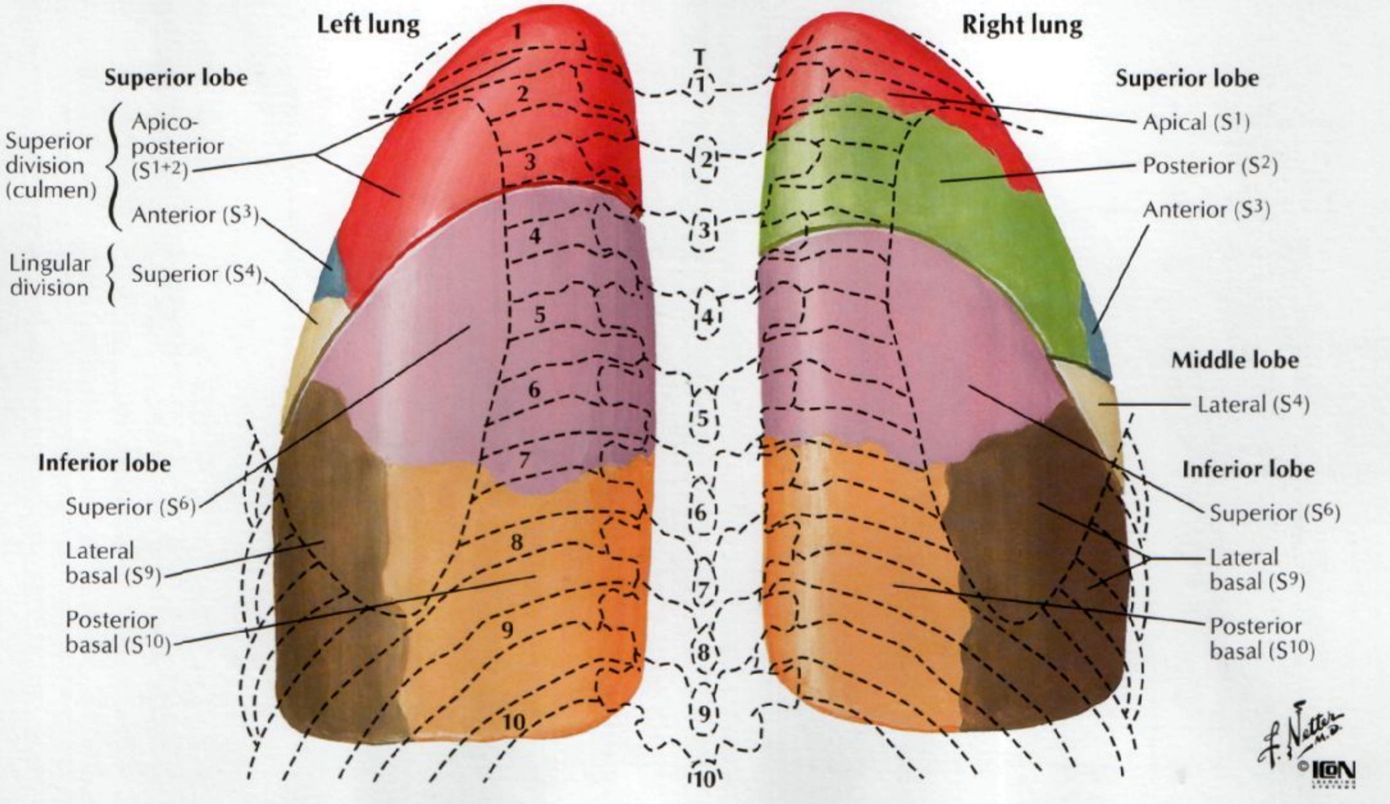

Left lung

Bronchopulmonary Segments

Anterior view

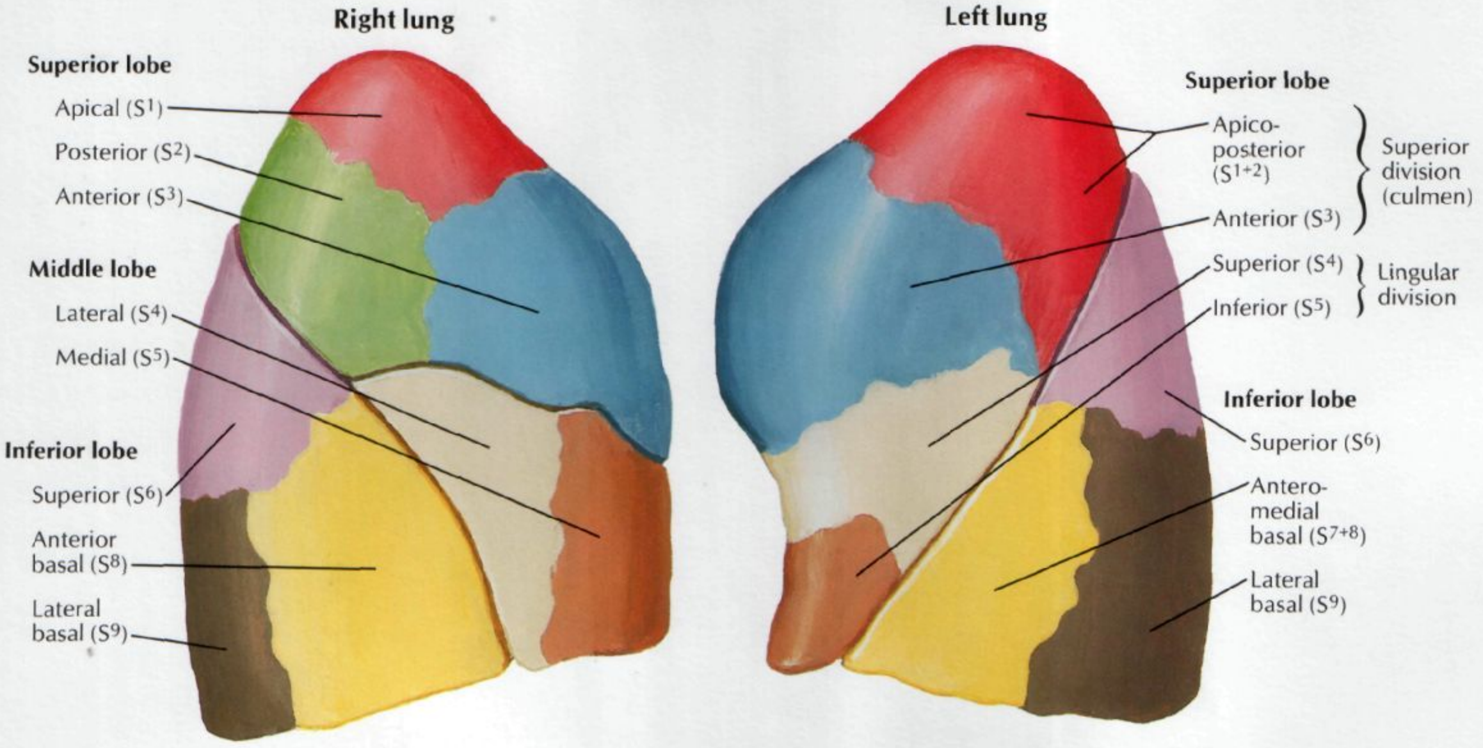


Posterior view



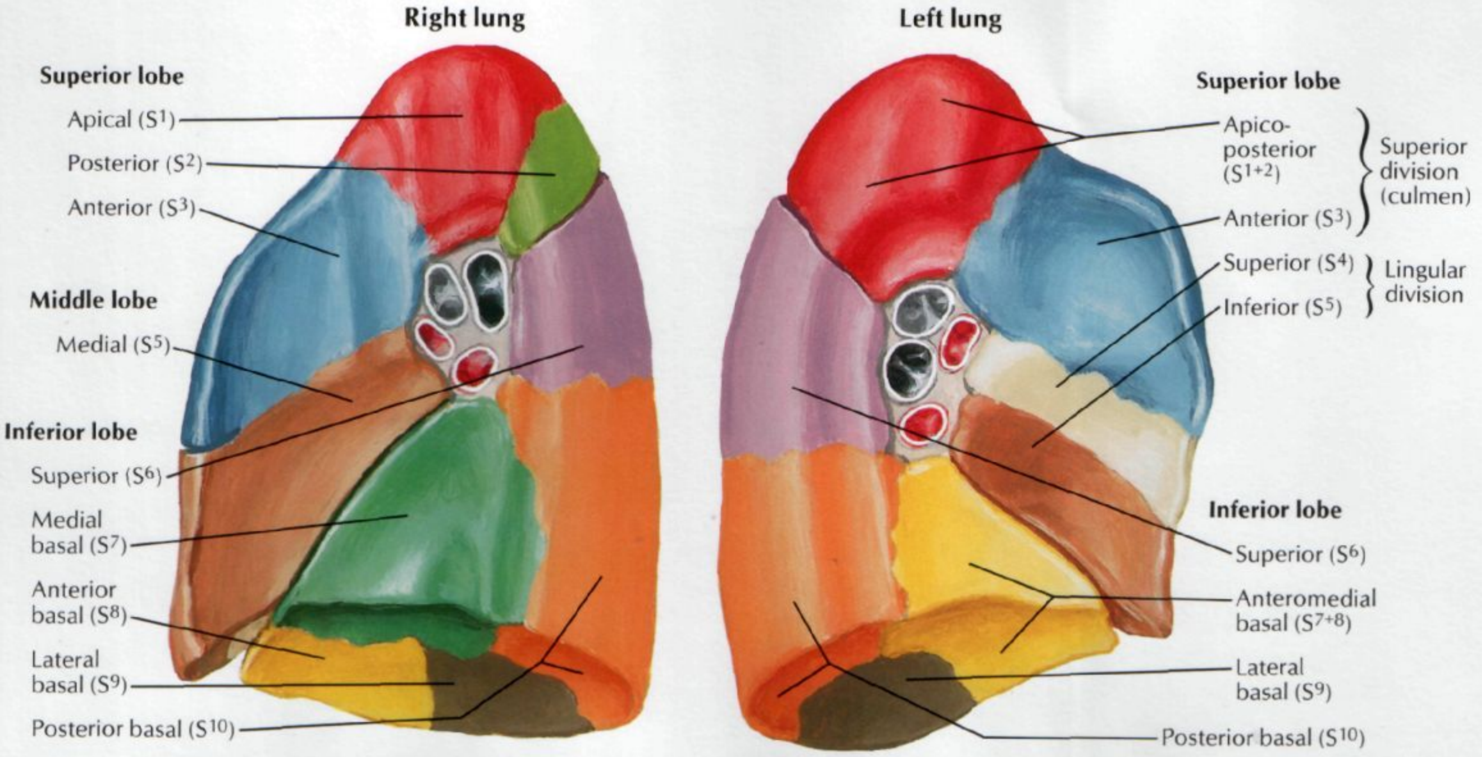
Bronchopulmonary Segments (continued)

Lateral views


Right lung

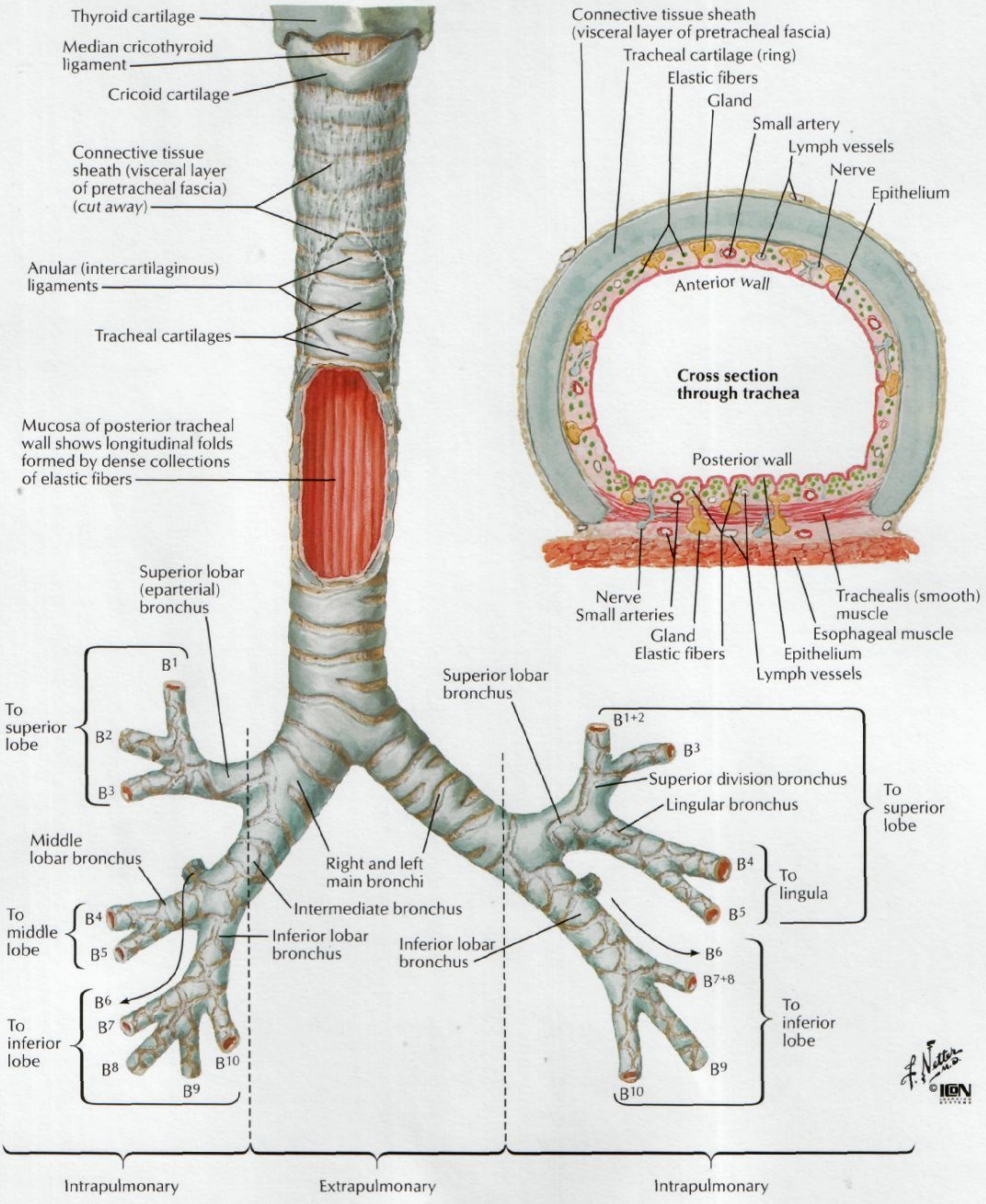
Left lung

Medial views

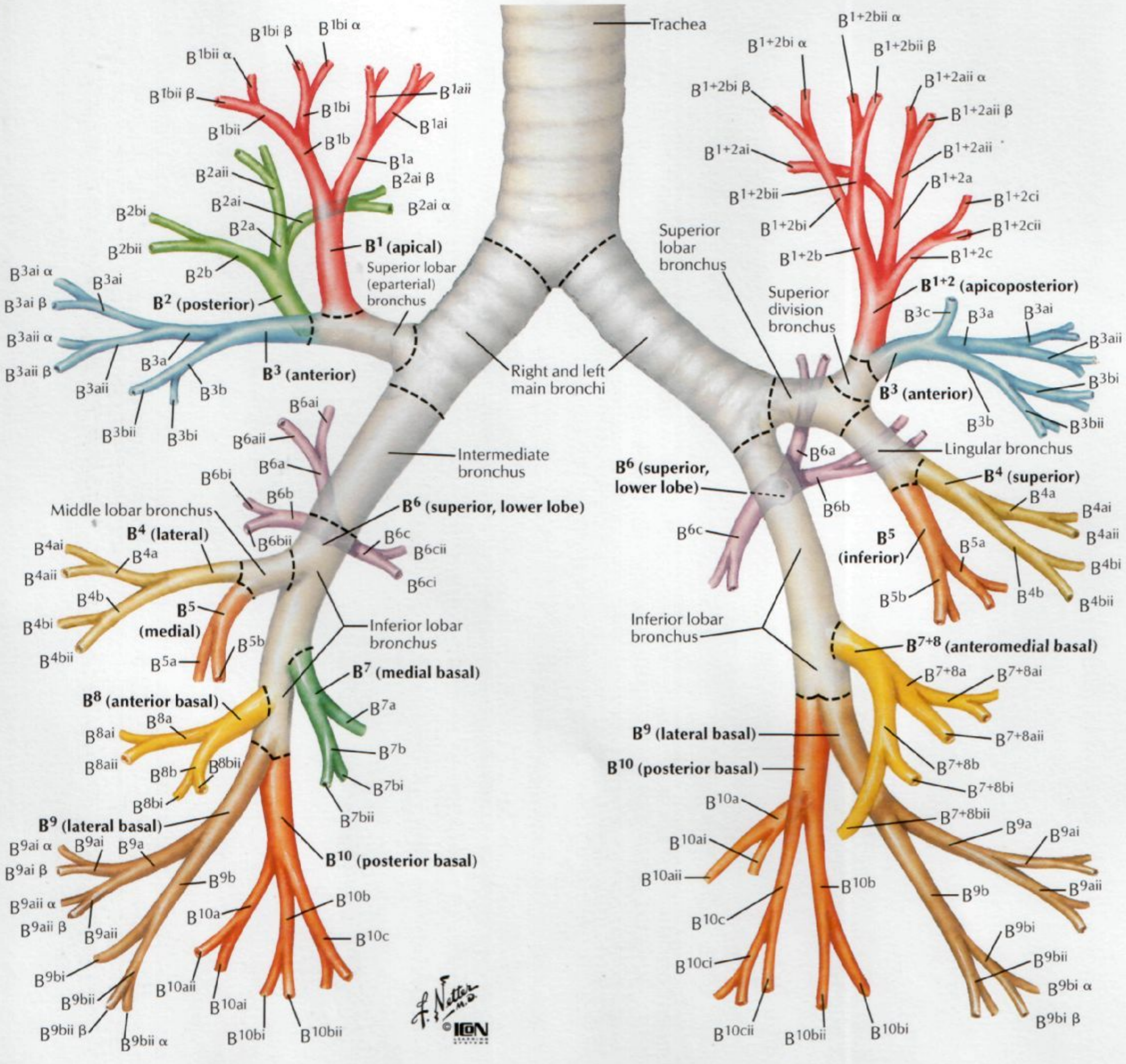

Right lung

Left lung

Trachea and Major Bronchi



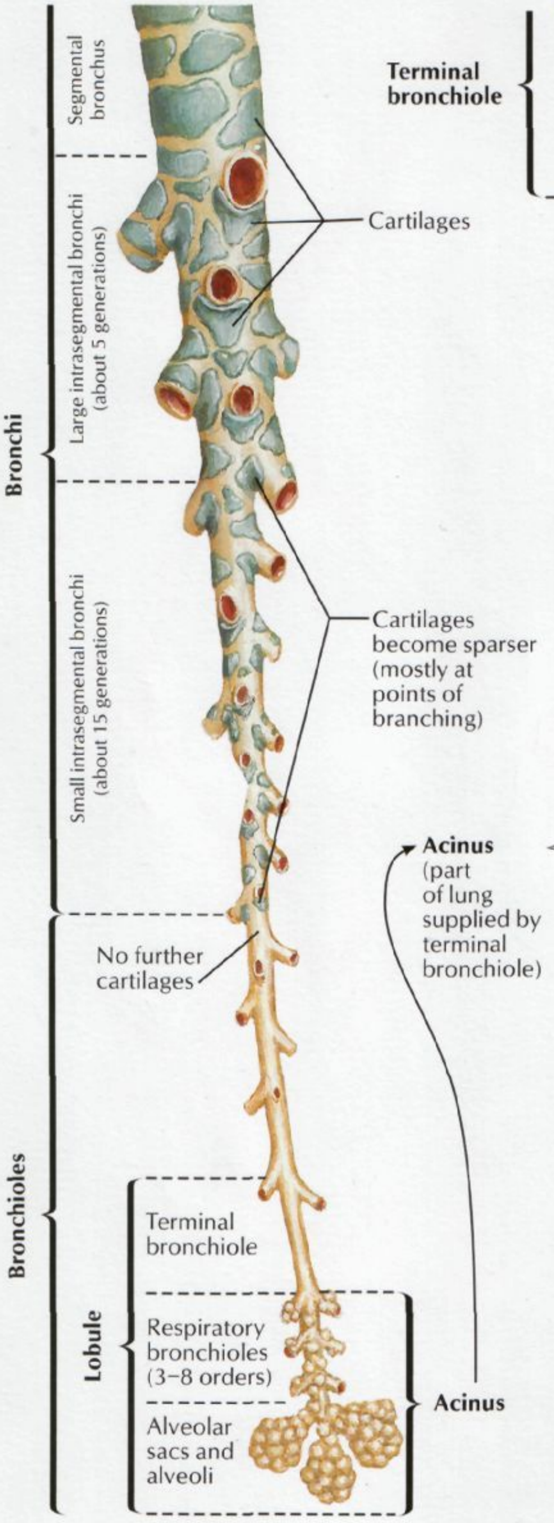
Nomenclature of Bronchi: Schema



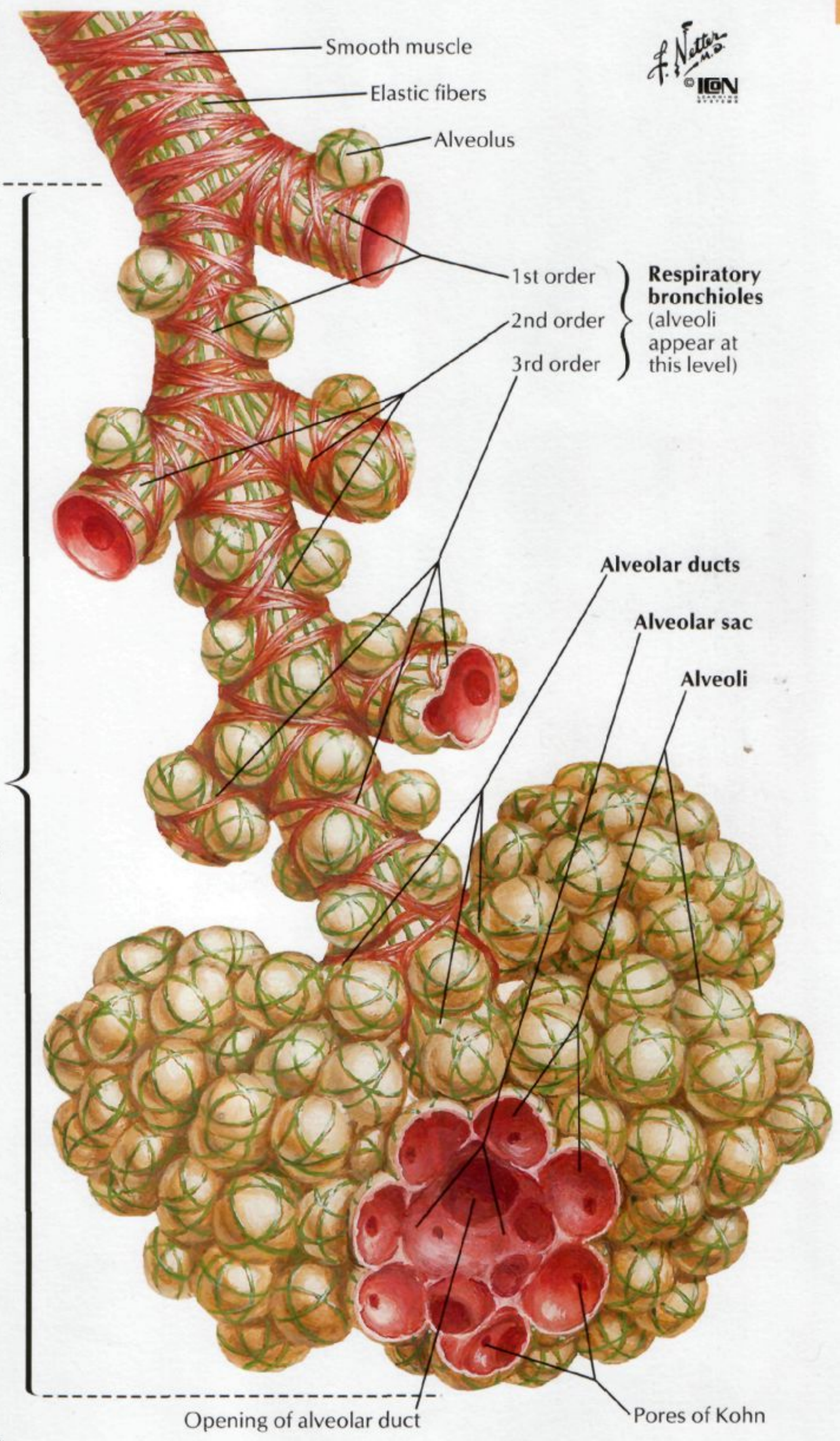
Nomenclature in common usage for bronchopulmonary segments (Plates 196 and 197) is that of Jackson and Huber, and segmental bronchi are named accordingly. Ikeda proposed nomenclature (as demonstrated here) for bronchial subdivisions as far as 6th generation. For simplification on this illustration, only some bronchial subdivisions are labeled as far as 5th or 6th generation. Segmental bronchi (B) are numbered from 1 to 10 in each lung, corresponding to pulmonary segments. In left lung, B^1 and B^2 are combined as are B^7 and B^8. Subsegmental, or 4th order, bronchi are indicated by addition of lowercase letters a, b or c when an additional branch is present. Fifth order bronchi are designated by Roman numerals i (anterior) or ii (posterior) and 6th order bronchi by Greek letters α or β. Several texts use alternate numbers (as proposed by Boyden) for segmental bronchi.

Variations of standard bronchial pattern shown here are common, especially in peripheral airways.

Intrapulmonary Airways: Schema

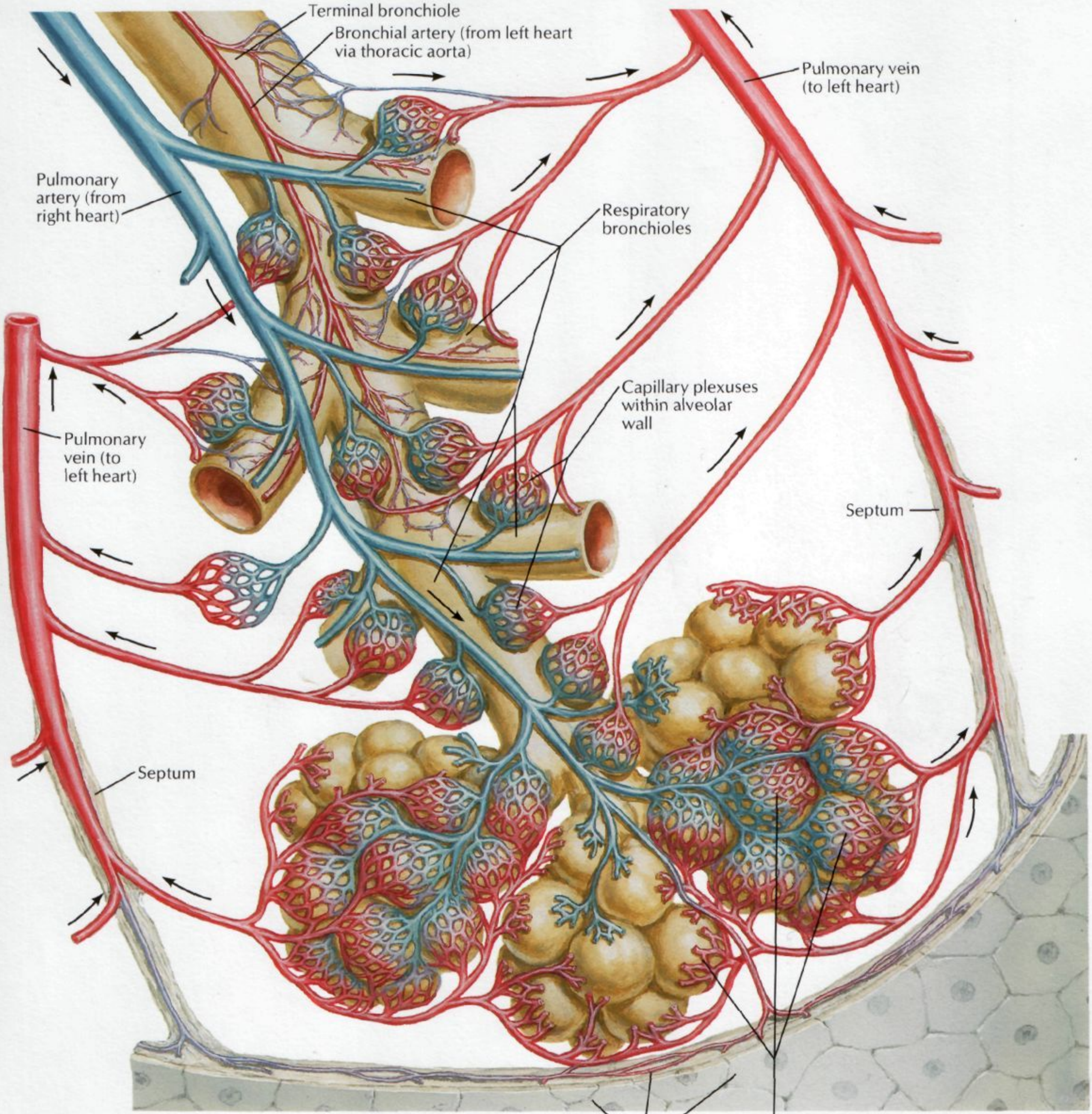

Bronchi
Segmental bronchus
Large intrasegmental bronchi (about 5 generations)
Small intrasegmental bronchi (about 15 generations)
Cartilages
Cartilages become sparser (mostly at points of branching)
Bronchioles
No further cartilages
Acinus (part of lung supplied by terminal bronchiole)
Lobule
Terminal bronchiole
Respiratory bronchioles (3–8 orders)
Alveolar sacs and alveoli
Acinus

Subdivisions of intrapulmonary airways



Structure of intrapulmonary airways

Intrapulmonary Blood Circulation: Schema


Terminal bronchiole
Bronchial artery (from left heart via thoracic aorta)
Pulmonary vein (to left heart)
Pulmonary artery (from right heart)
Respiratory bronchioles
Capillary plexuses within alveolar wall
Pulmonary vein (to left heart)
Septum
Septum
Visceral pleura and subpleural capillaries
Capillary bed within alveolar wall (*cut away in places*)

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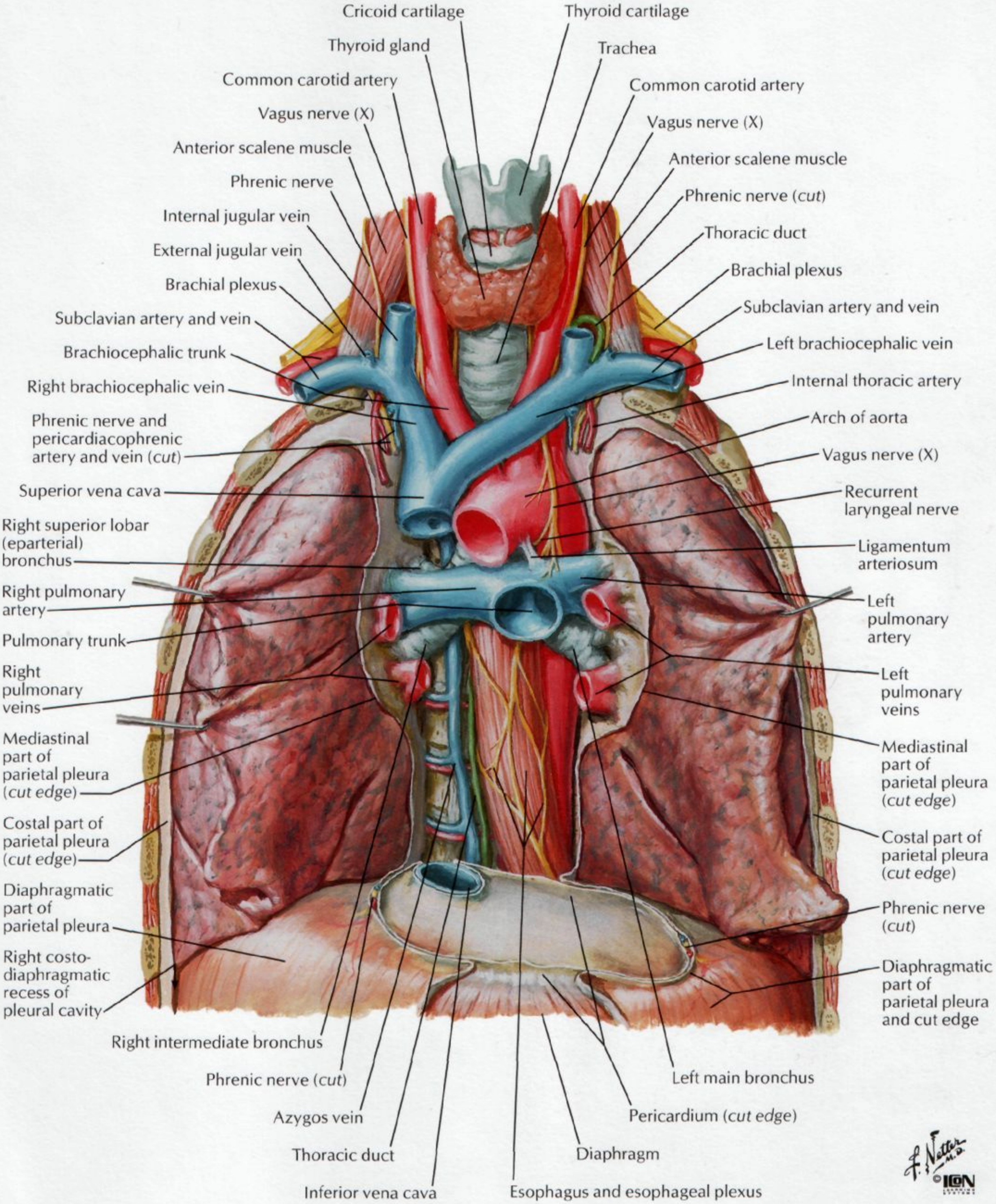
Cricoid cartilage
Thyroid cartilage
Thyroid gland
Trachea
Common carotid artery
Common carotid artery
Vagus nerve (X)
Vagus nerve (X)
Anterior scalene muscle
Anterior scalene muscle
Phrenic nerve
Phrenic nerve (cut)
Internal jugular vein
Thoracic duct
External jugular vein
Brachial plexus
Brachial plexus
Subclavian artery and vein
Subclavian artery and vein
Left brachiocephalic vein
Brachiocephalic trunk
Internal thoracic artery
Right brachiocephalic vein
Arch of aorta
Phrenic nerve and pericardiacophrenic artery and vein (cut)
Vagus nerve (X)
Superior vena cava
Recurrent laryngeal nerve
Right superior lobar (eparterial) bronchus
Ligamentum arteriosum
Right pulmonary artery
Left pulmonary artery
Pulmonary trunk
Right pulmonary veins
Left pulmonary veins
Mediastinal part of parietal pleura (cut edge)
Mediastinal part of parietal pleura (cut edge)
Costal part of parietal pleura (cut edge)
Costal part of parietal pleura (cut edge)
Diaphragmatic part of parietal pleura
Phrenic nerve (cut)
Right costodiaphragmatic recess of pleural cavity
Diaphragmatic part of parietal pleura and cut edge
Right intermediate bronchus
Phrenic nerve (cut)
Left main bronchus
Azygos vein
Pericardium (cut edge)
Thoracic duct
Diaphragm
Inferior vena cava
Esophagus and esophageal plexus
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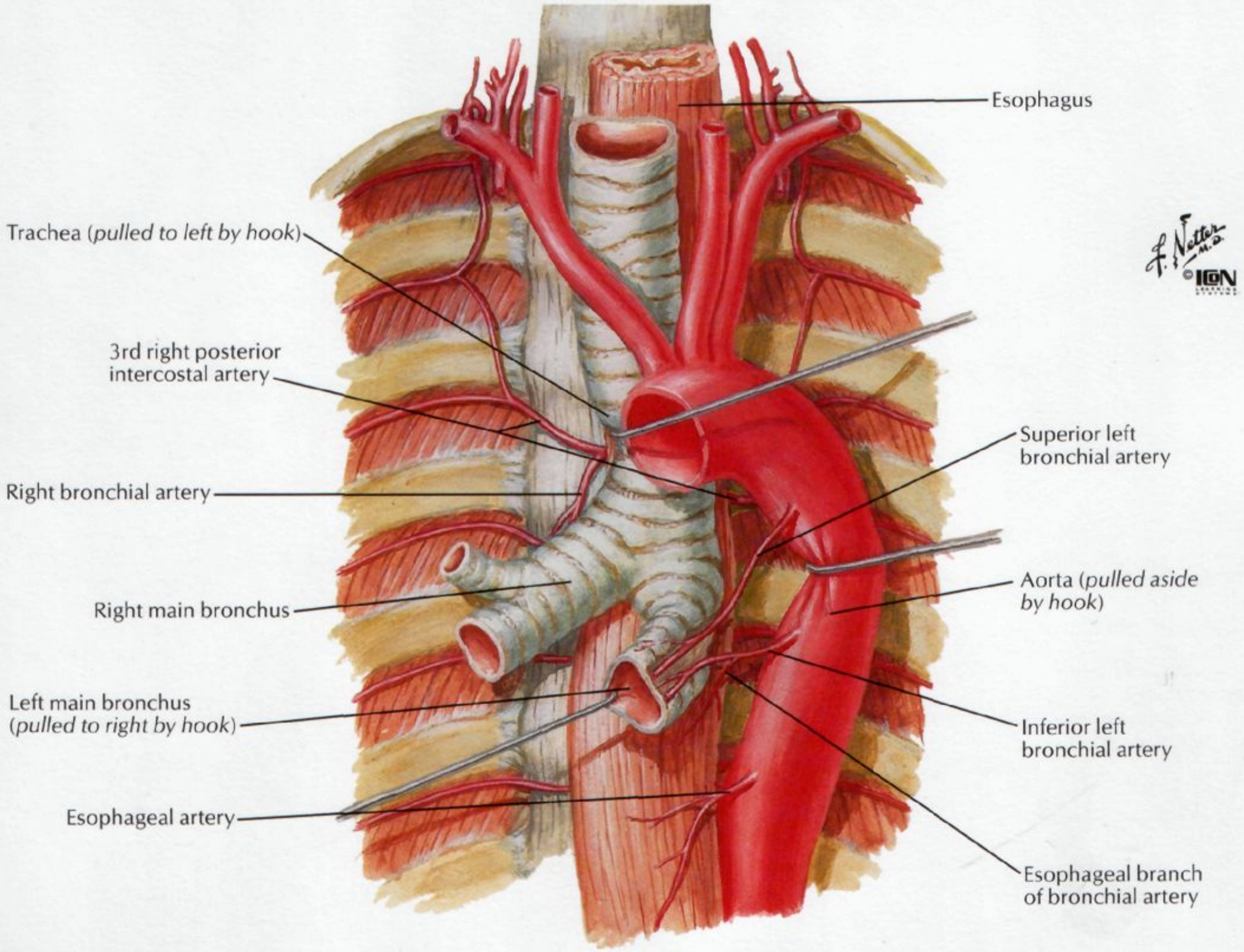
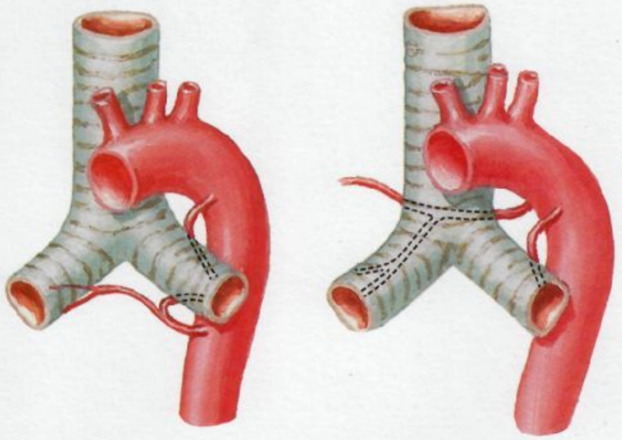
Bronchial Arteries and Veins


Esophagus
Trachea (*pulled to left by hook*)
3rd right posterior intercostal artery
Right bronchial artery
Right main bronchus
Left main bronchus (*pulled to right by hook*)
Esophageal artery
Superior left bronchial artery
Aorta (*pulled aside by hook*)
Inferior left bronchial artery
Esophageal branch of bronchial artery

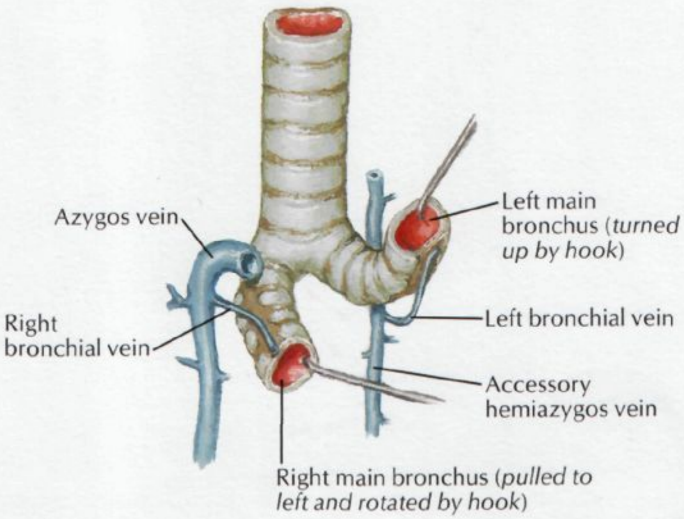
Variations in bronchial arteries



Right and left bronchial arteries originating from aorta by single stem

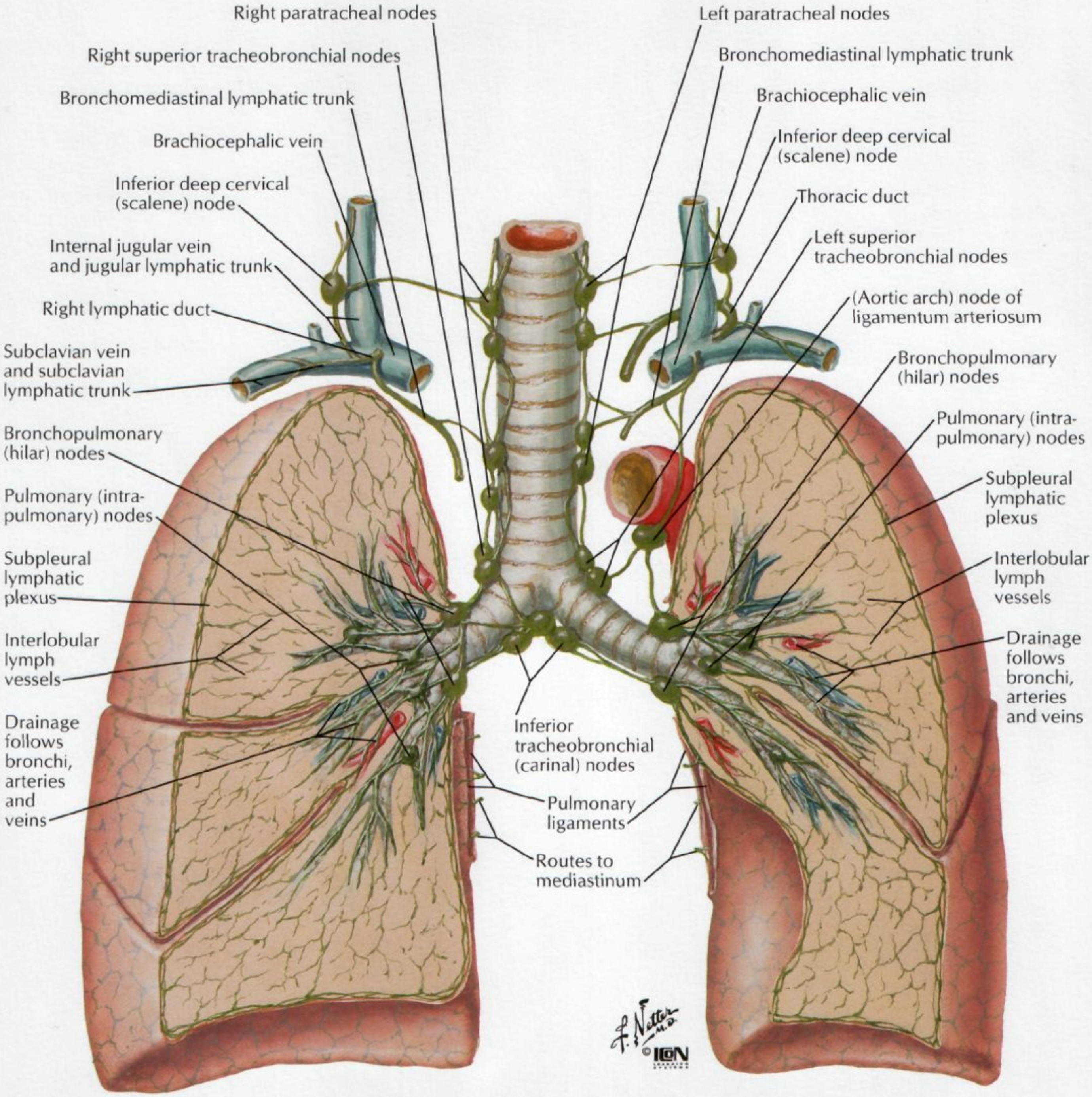
Only single bronchial artery to each bronchus (normally, two to left bronchus)

Bronchial veins


Azygos vein
Right bronchial vein
Left main bronchus (*turned up by hook*)
Left bronchial vein
Accessory hemiazygos vein
Right main bronchus (*pulled to left and rotated by hook*)

Lymph Vessels and Nodes of Lung

SEE ALSO PLATES 68, 177, 235


Right paratracheal nodes
Right superior tracheobronchial nodes
Bronchomediastinal lymphatic trunk
Brachiocephalic vein
Inferior deep cervical (scalene) node
Internal jugular vein and jugular lymphatic trunk
Right lymphatic duct
Subclavian vein and subclavian lymphatic trunk
Bronchopulmonary (hilar) nodes
Pulmonary (intrapulmonary) nodes
Subpleural lymphatic plexus
Interlobular lymph vessels
Drainage follows bronchi, arteries and veins
Left paratracheal nodes
Bronchomediastinal lymphatic trunk
Brachiocephalic vein
Inferior deep cervical (scalene) node
Thoracic duct
Left superior tracheobronchial nodes
(Aortic arch) node of ligamentum arteriosum
Bronchopulmonary (hilar) nodes
Pulmonary (intrapulmonary) nodes
Subpleural lymphatic plexus
Interlobular lymph vessels
Drainage follows bronchi, arteries and veins
Inferior tracheobronchial (carinal) nodes
Pulmonary ligaments
Routes to mediastinum
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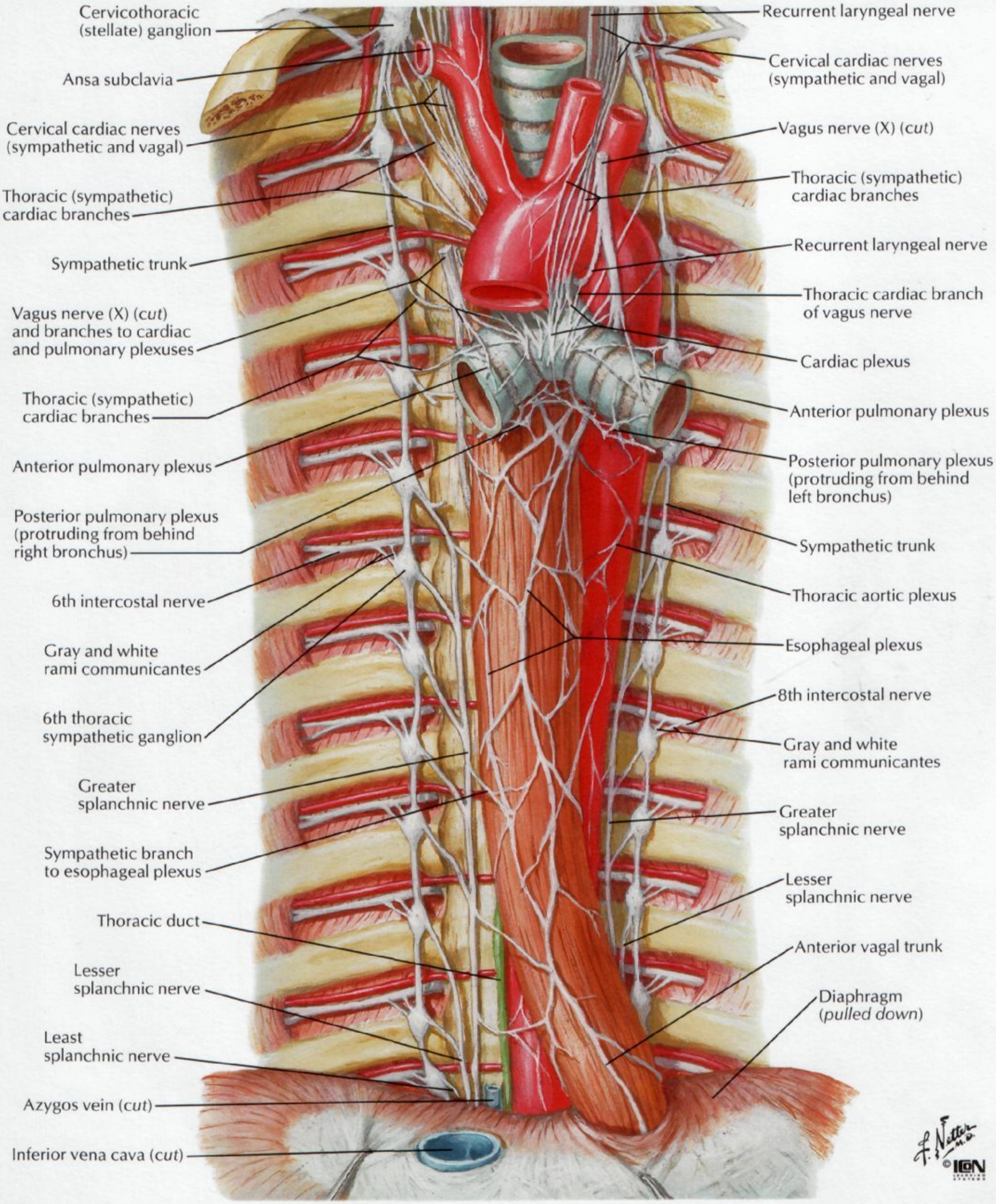
Drainage routes

Right lung: All lobes drain to pulmonary and bronchopulmonary (hilar) nodes, then to inferior tracheobronchial (carinal) nodes, right superior tracheobronchial nodes and to right paratracheal nodes on way to brachiocephalic vein via bronchomediastinal lymphatic trunk and/or inferior deep cervical (scalene) node.

Left lung: Superior lobe drains to pulmonary and bronchopulmonary (hilar) nodes, inferior tracheobronchial (carinal) nodes, left superior tracheobronchial nodes, left paratracheal nodes and/or (aortic arch) node of ligamentum arteriosum, then to brachiocephalic vein via left bronchomediastinal trunk and thoracic duct. Left inferior lobe drains also to pulmonary and bronchopulmonary (hilar) nodes and to inferior tracheobronchial (carinal) nodes, but then mostly to right superior tracheobronchial nodes, where it follows same route as lymph from right lung.

Autonomic Nerves in Thorax

SEE ALSO PLATES 124, 125, 159, 308


Cervicothoracic (stellate) ganglion
Ansa subclavia
Cervical cardiac nerves (sympathetic and vagal)
Thoracic (sympathetic) cardiac branches
Sympathetic trunk
Vagus nerve (X) (*cut*) and branches to cardiac and pulmonary plexuses
Thoracic (sympathetic) cardiac branches
Anterior pulmonary plexus
Posterior pulmonary plexus (protruding from behind right bronchus)
6th intercostal nerve
Gray and white rami communicantes
6th thoracic sympathetic ganglion
Greater splanchnic nerve
Sympathetic branch to esophageal plexus
Thoracic duct
Lesser splanchnic nerve
Least splanchnic nerve
Azygos vein (*cut*)
Inferior vena cava (*cut*)
Recurrent laryngeal nerve
Cervical cardiac nerves (sympathetic and vagal)
Vagus nerve (X) (*cut*)
Thoracic (sympathetic) cardiac branches
Recurrent laryngeal nerve
Thoracic cardiac branch of vagus nerve
Cardiac plexus
Anterior pulmonary plexus
Posterior pulmonary plexus (protruding from behind left bronchus)
Sympathetic trunk
Thoracic aortic plexus
Esophageal plexus
8th intercostal nerve
Gray and white rami communicantes
Greater splanchnic nerve
Lesser splanchnic nerve
Anterior vagal trunk
Diaphragm (*pulled down*)
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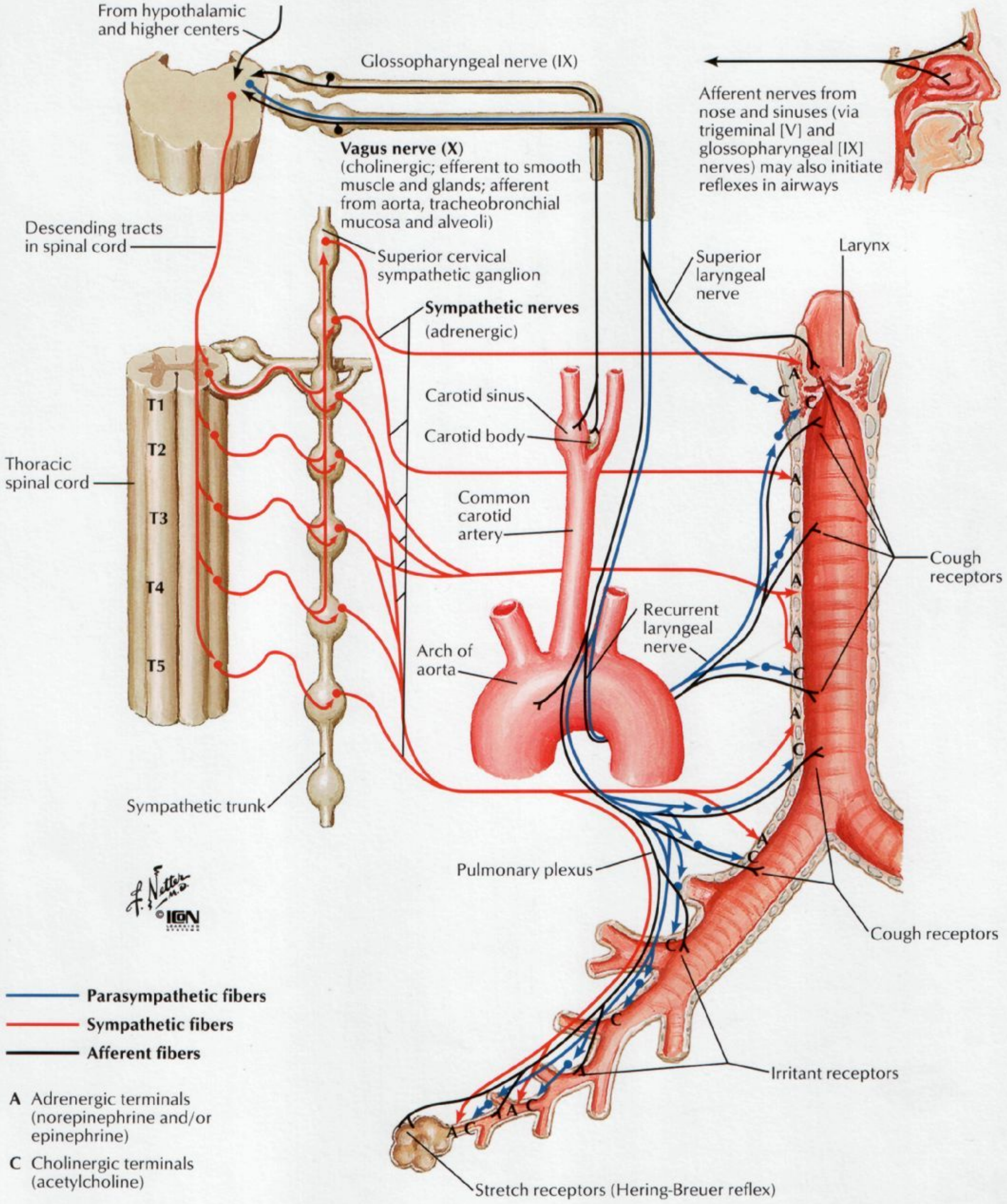
Innervation of Tracheobronchial Tree: Schema

SEE ALSO PLATE 160



From hypothalamic and higher centers
Glossopharyngeal nerve (IX)
Afferent nerves from nose and sinuses (via trigeminal [V] and glossopharyngeal [IX] nerves) may also initiate reflexes in airways
Vagus nerve (X)
(cholinergic; efferent to smooth muscle and glands; afferent from aorta, tracheobronchial mucosa and alveoli)
Descending tracts in spinal cord
Superior cervical sympathetic ganglion
Superior laryngeal nerve
Larynx
Sympathetic nerves
(adrenergic)
Carotid sinus
Carotid body
T1
T2
T3
T4
T5
Thoracic spinal cord
Common carotid artery
Cough receptors
Recurrent laryngeal nerve
Arch of aorta
Sympathetic trunk
Pulmonary plexus
Cough receptors
Irritant receptors
Stretch receptors (Hering-Breuer reflex)
A
C
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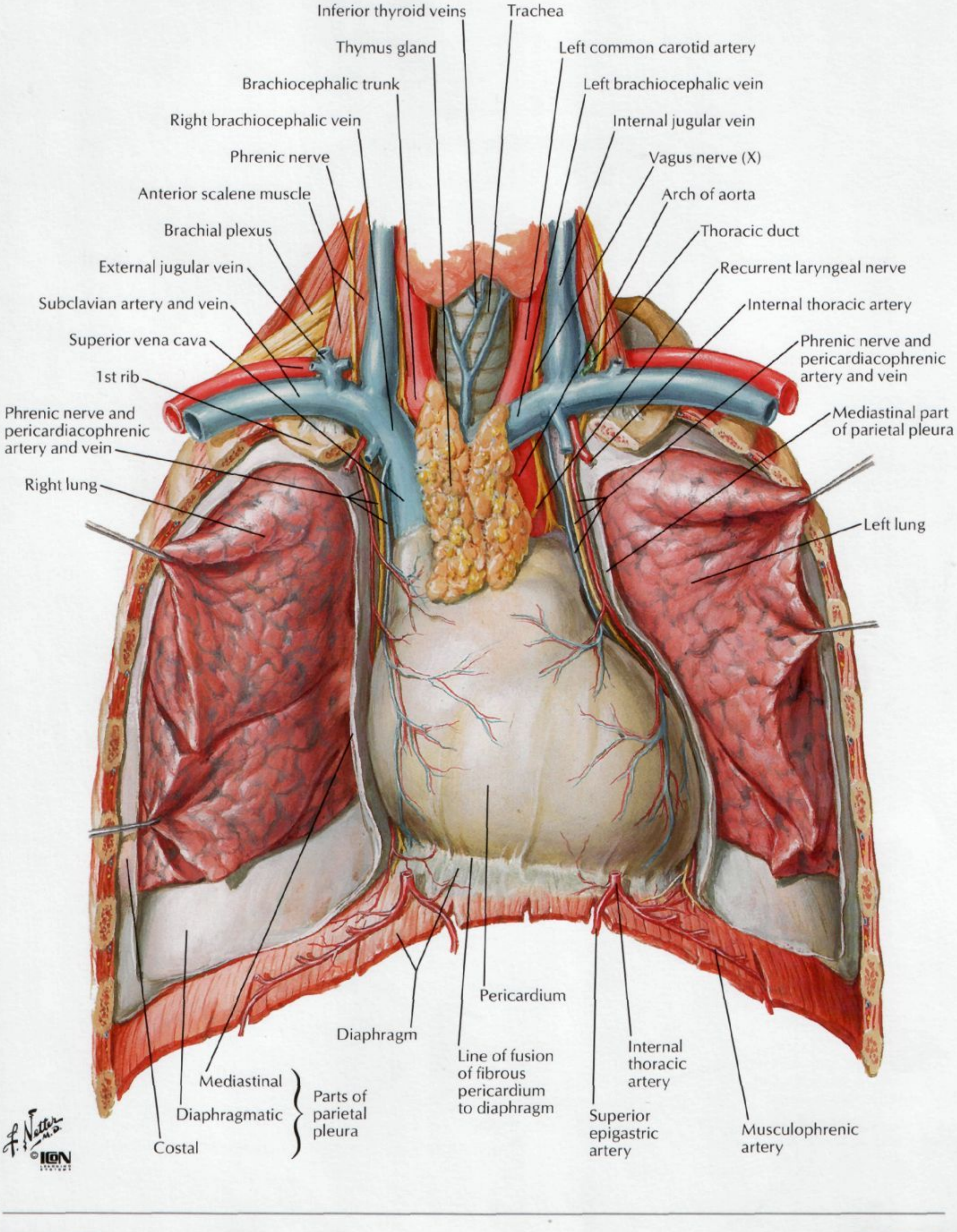
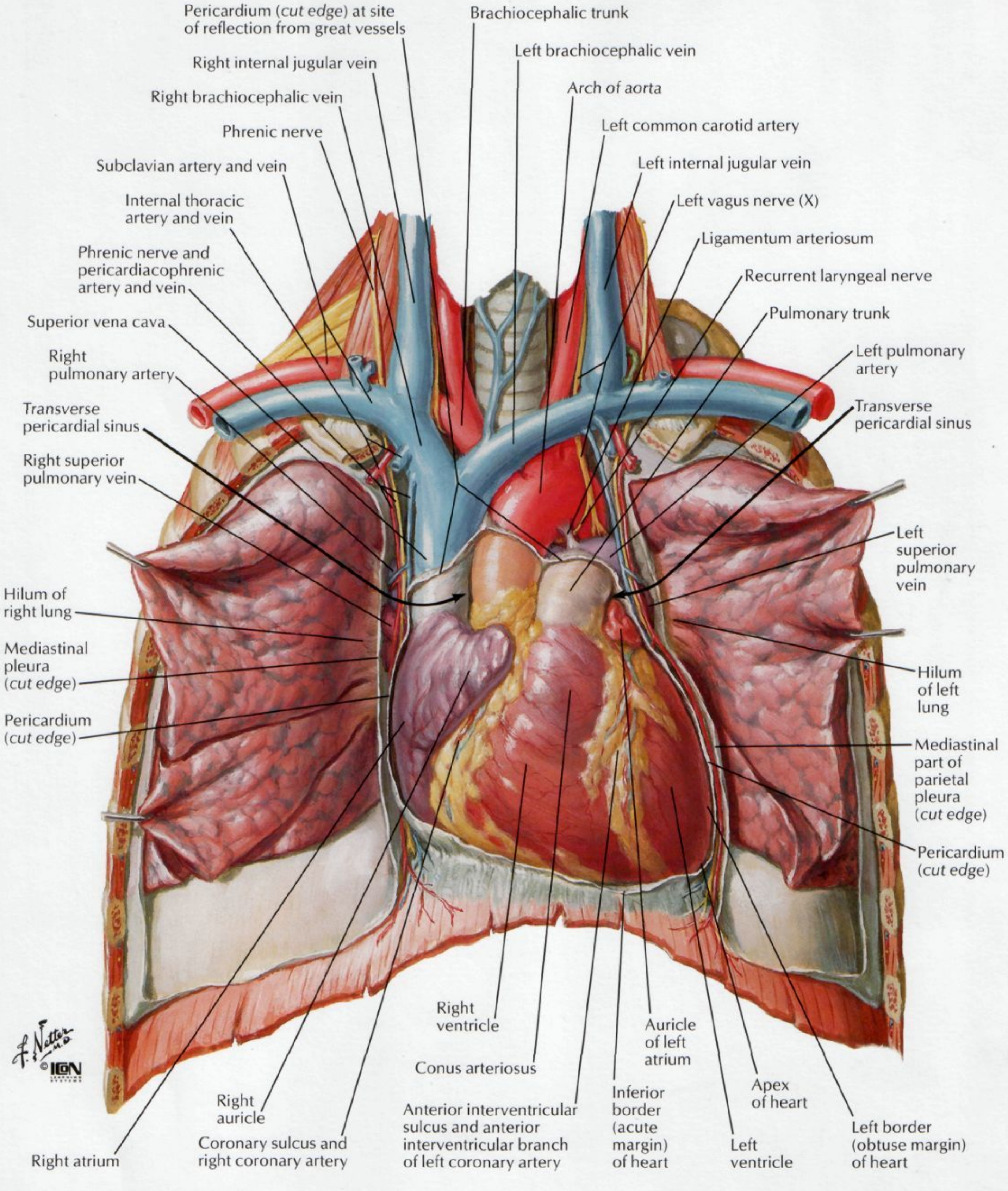
Parasympathetic fibers
Sympathetic fibers
Afferent fibers
A Adrenergic terminals (norepinephrine and/or epinephrine)
C Cholinergic terminals (acetylcholine)

Heart In Situ



Heart: Anterior Exposure


Pericardium (*cut edge*) at site of reflection from great vessels
Brachiocephalic trunk
Right internal jugular vein
Left brachiocephalic vein
Right brachiocephalic vein
Arch of aorta
Phrenic nerve
Left common carotid artery
Subclavian artery and vein
Left internal jugular vein
Internal thoracic artery and vein
Left vagus nerve (X)
Ligamentum arteriosum
Phrenic nerve and pericardiacophrenic artery and vein
Recurrent laryngeal nerve
Superior vena cava
Pulmonary trunk
Right pulmonary artery
Left pulmonary artery
Transverse pericardial sinus
Transverse pericardial sinus
Right superior pulmonary vein
Left superior pulmonary vein
Hilum of right lung
Mediastinal pleura (*cut edge*)
Hilum of left lung
Pericardium (*cut edge*)
Mediastinal part of parietal pleura (*cut edge*)
Pericardium (*cut edge*)
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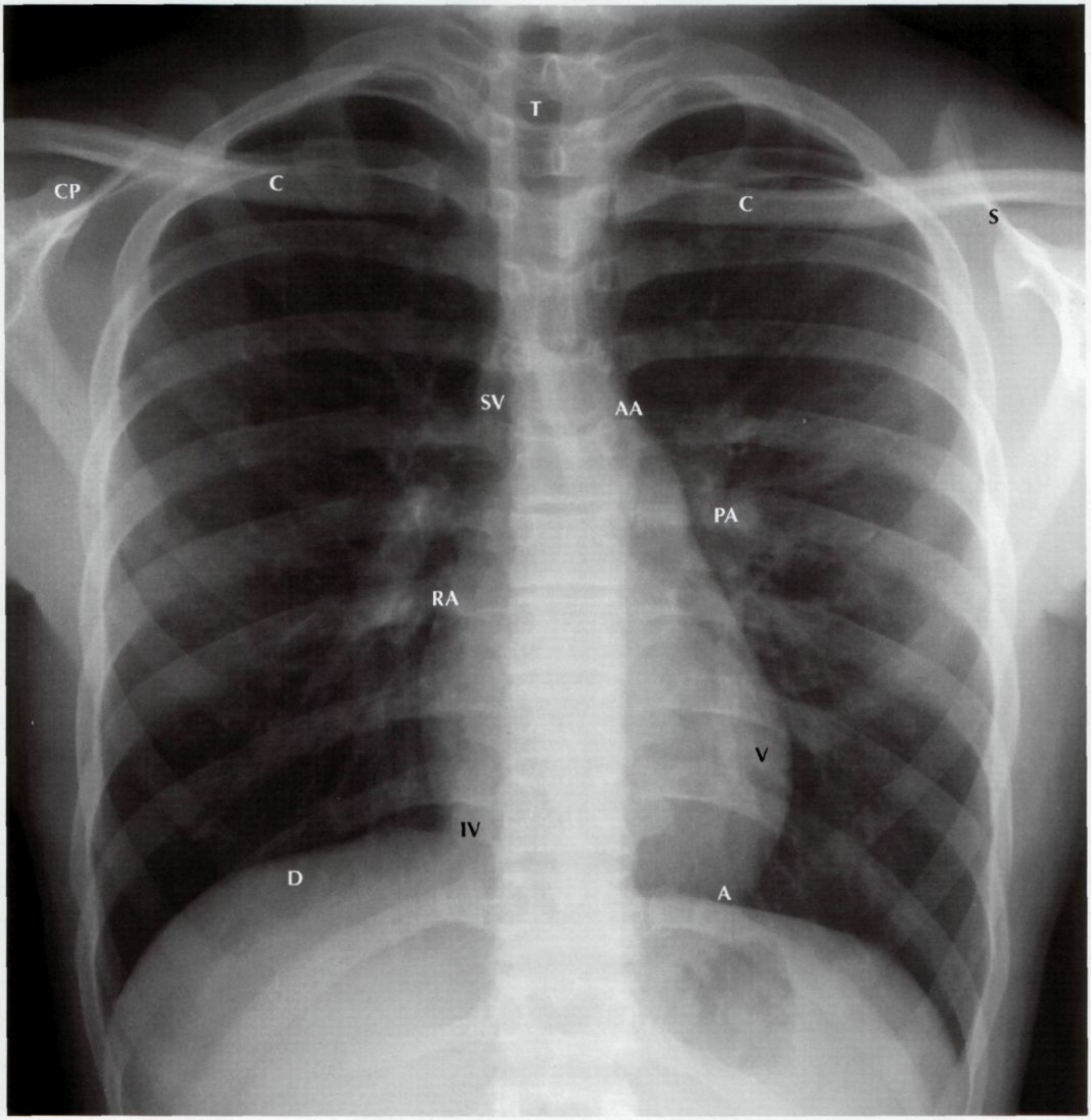
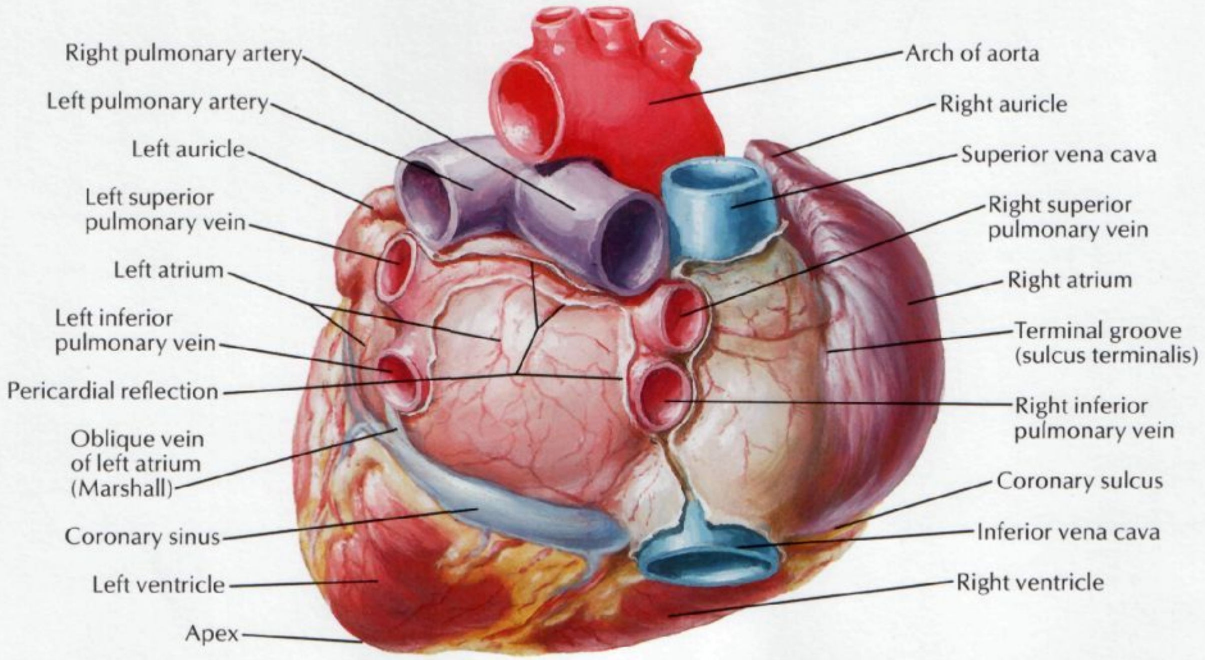
Right ventricle
Auricle of left atrium
Conus arteriosus
Apex of heart
Right auricle
Inferior border (acute margin) of heart
Right atrium
Coronary sulcus and right coronary artery
Anterior interventricular sulcus and anterior interventricular branch of left coronary artery
Left ventricle
Left border (obtuse margin) of heart

Radiograph of Chest

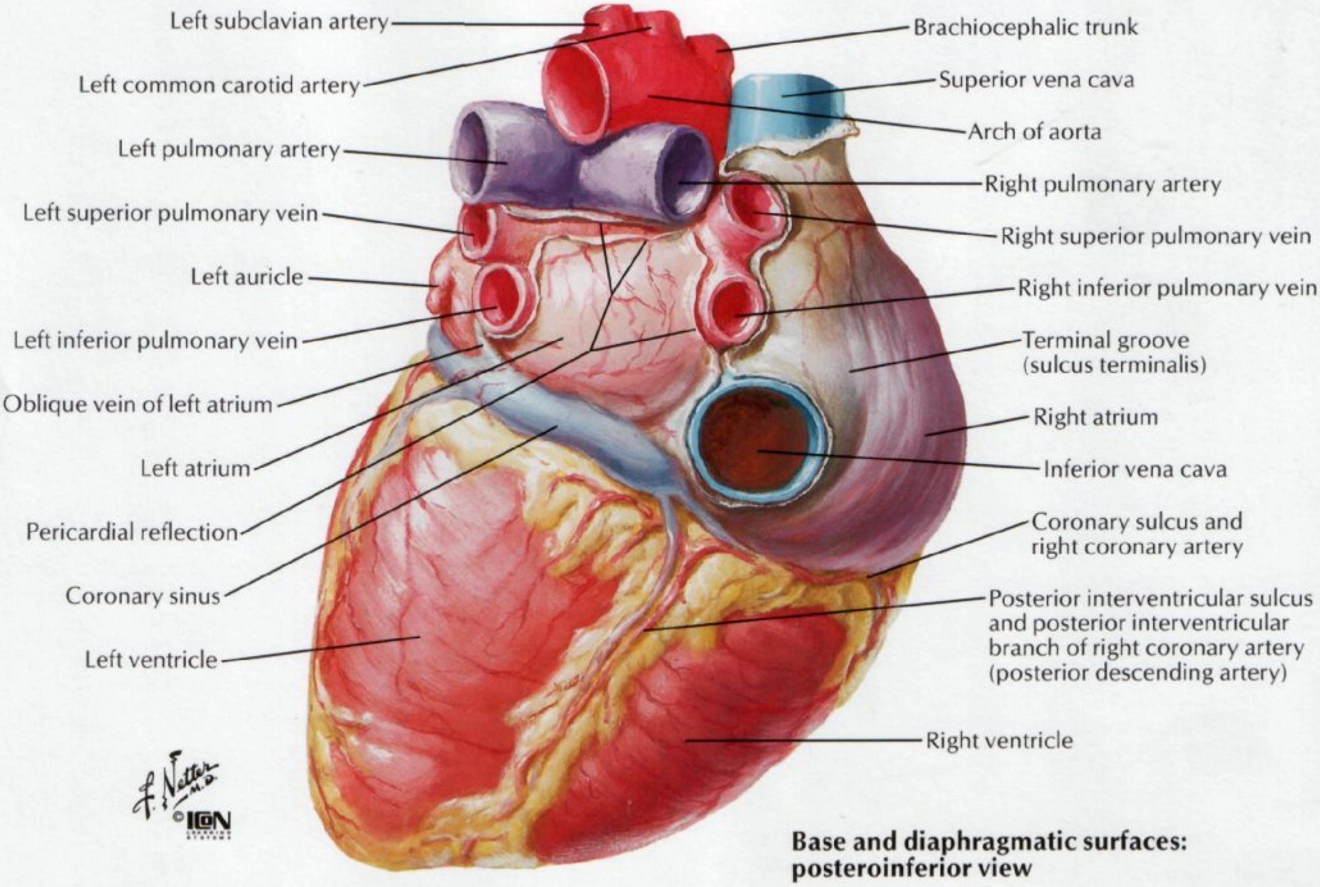


A	Apex of heart
AA	Aortic arch
C	Clavicle
CP	Coracoid process of scapula
D	Dome of diaphragm (right)
IV	Inferior vena cava
PA	Pulmonary artery (left)
RA	Right atrium
S	Spine of scapula
SV	Superior vena cava
T	Trachea (air)
V	Left ventricle

Heart: Base and Diaphragmatic Surfaces

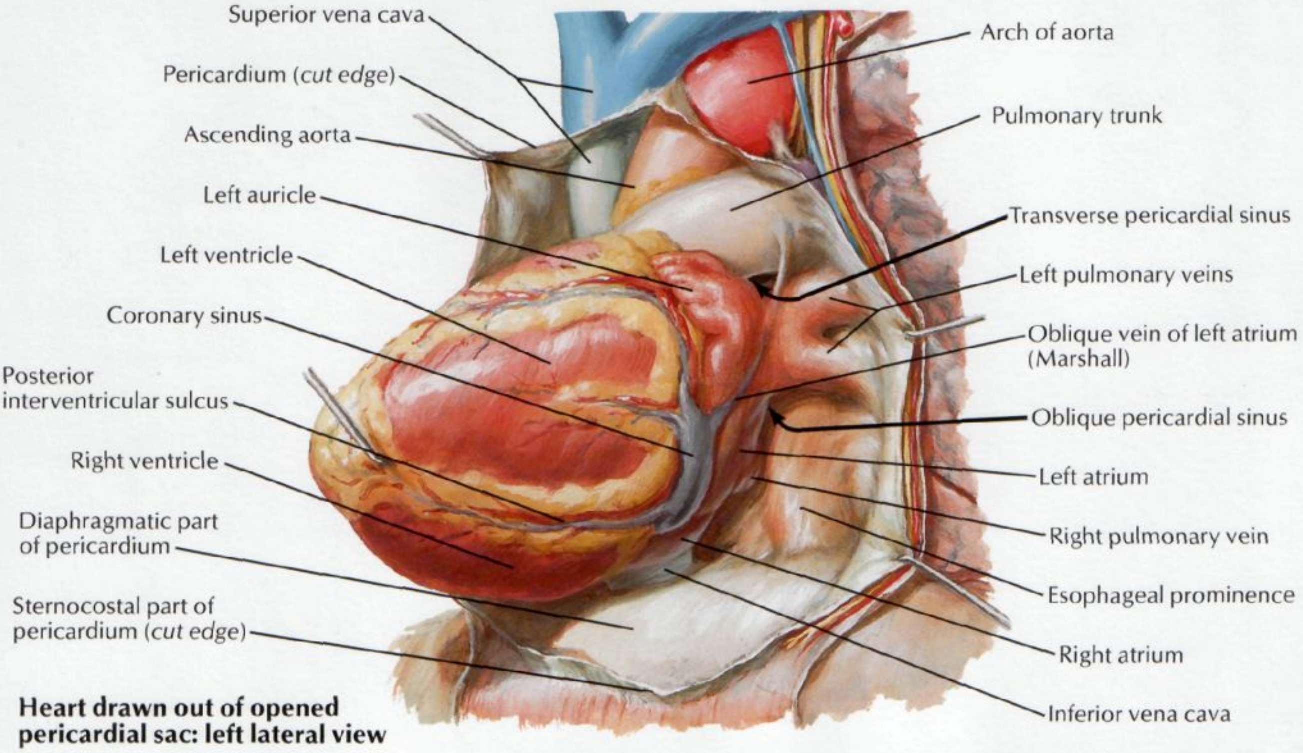


Base of heart: posterior view

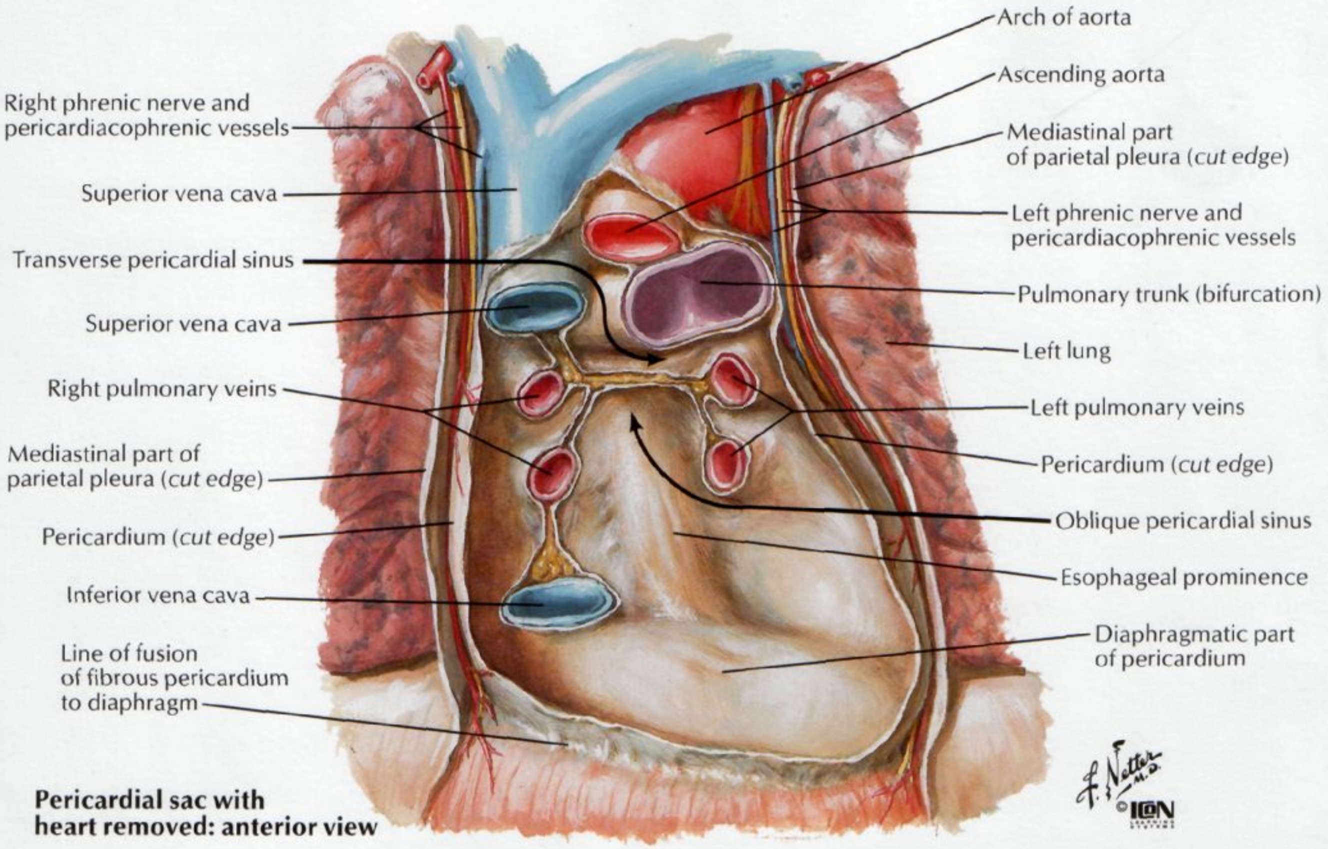

Left subclavian artery
Left common carotid artery
Left pulmonary artery
Left superior pulmonary vein
Left auricle
Left inferior pulmonary vein
Oblique vein of left atrium
Left atrium
Pericardial reflection
Coronary sinus
Left ventricle
Brachiocephalic trunk
Superior vena cava
Arch of aorta
Right pulmonary artery
Right superior pulmonary vein
Right inferior pulmonary vein
Terminal groove (sulcus terminalis)
Right atrium
Inferior vena cava
Coronary sulcus and right coronary artery
Posterior interventricular sulcus and posterior interventricular branch of right coronary artery (posterior descending artery)
Right ventricle

Base and diaphragmatic surfaces: posteroinferior view

Pericardial Sac



Heart drawn out of opened pericardial sac: left lateral view


Right phrenic nerve and pericardiacophrenic vessels
Superior vena cava
Transverse pericardial sinus
Superior vena cava
Right pulmonary veins
Mediastinal part of parietal pleura (*cut edge*)
Pericardium (*cut edge*)
Inferior vena cava
Line of fusion of fibrous pericardium to diaphragm
Arch of aorta
Ascending aorta
Mediastinal part of parietal pleura (*cut edge*)
Left phrenic nerve and pericardiacophrenic vessels
Pulmonary trunk (bifurcation)
Left lung
Left pulmonary veins
Pericardium (*cut edge*)
Oblique pericardial sinus
Esophageal prominence
Diaphragmatic part of pericardium
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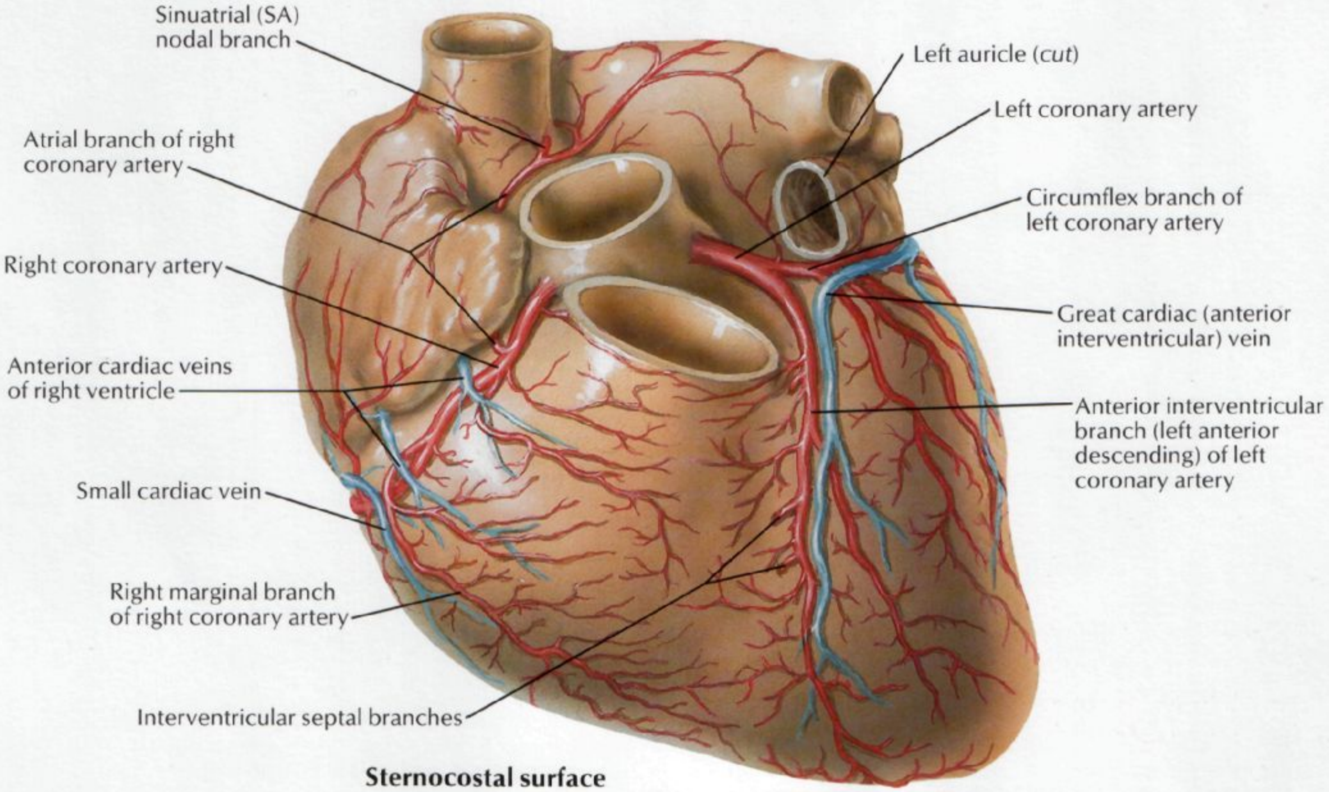
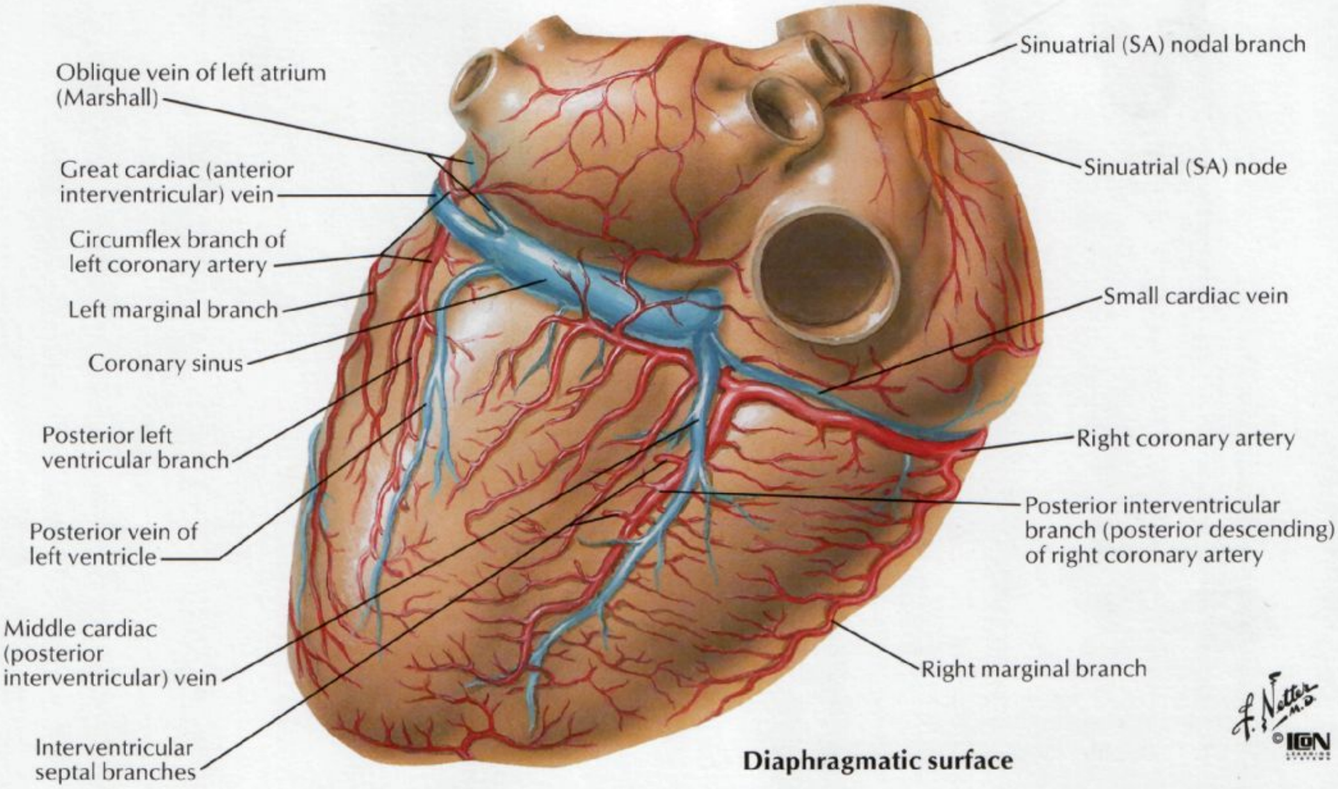
Pericardial sac with heart removed: anterior view

Coronary Arteries and Cardiac Veins

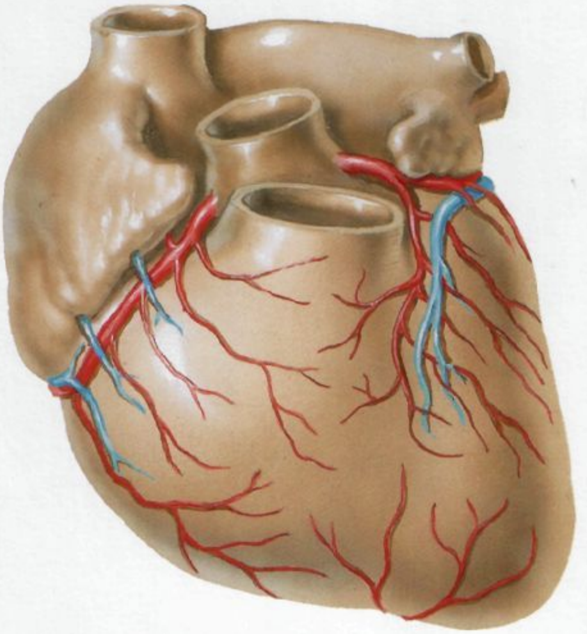

Sinuatrial (SA) nodal branch
Atrial branch of right coronary artery
Right coronary artery
Anterior cardiac veins of right ventricle
Small cardiac vein
Right marginal branch of right coronary artery
Interventricular septal branches
Left auricle (*cut*)
Left coronary artery
Circumflex branch of left coronary artery
Great cardiac (anterior interventricular) vein
Anterior interventricular branch (left anterior descending) of left coronary artery

Sternocostal surface

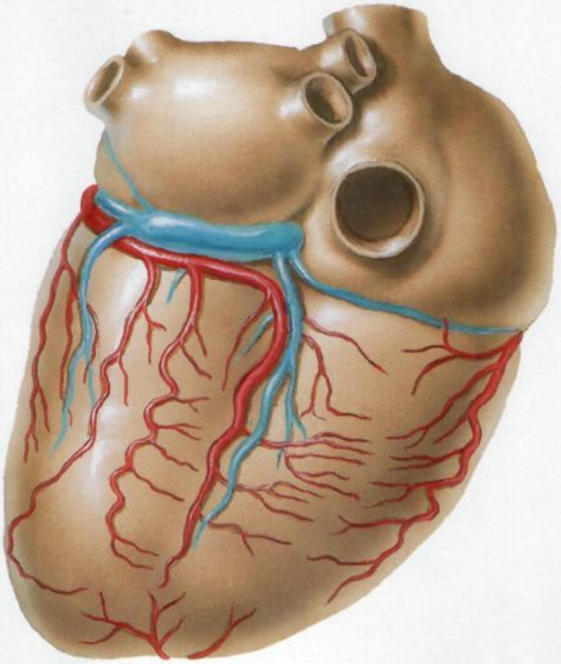

Oblique vein of left atrium (Marshall)
Great cardiac (anterior interventricular) vein
Circumflex branch of left coronary artery
Left marginal branch
Coronary sinus
Posterior left ventricular branch
Posterior vein of left ventricle
Middle cardiac (posterior interventricular) vein
Interventricular septal branches
Sinuatrial (SA) nodal branch
Sinuatrial (SA) node
Small cardiac vein
Right coronary artery
Posterior interventricular branch (posterior descending) of right coronary artery
Right marginal branch

Diaphragmatic surface

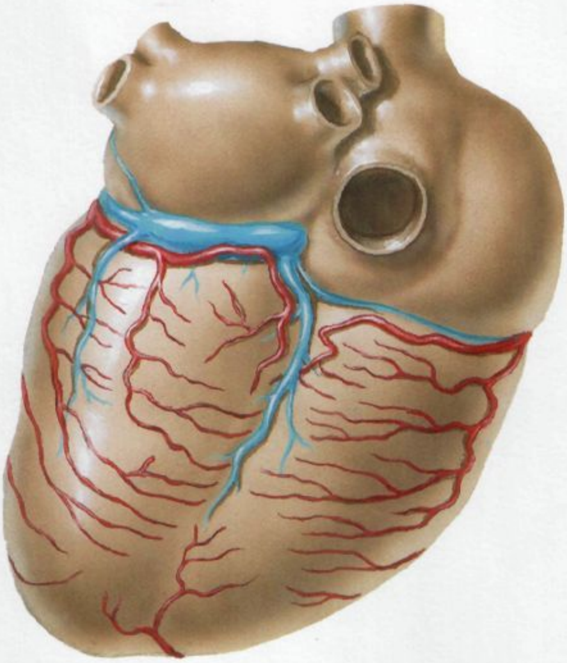
Coronary Arteries and Cardiac Veins: Variations



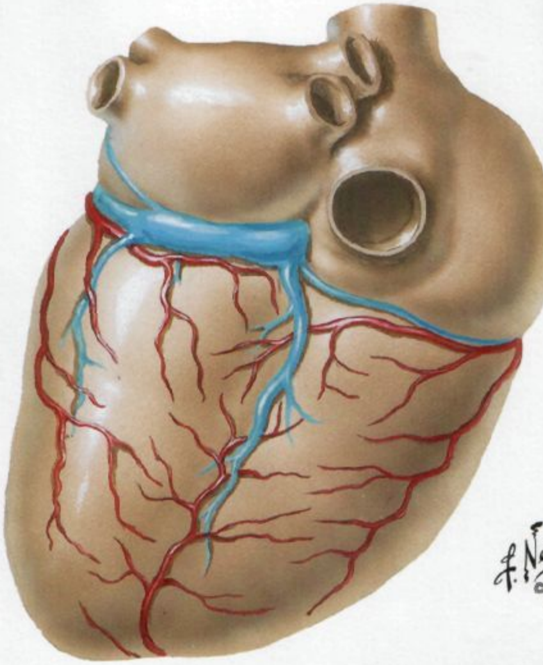
Anterior interventricular (left anterior descending) branch of left coronary artery very short. Apical part of anterior (sternocostal) surface supplied by branches from posterior interventricular (posterior descending) branch of right coronary artery curving around apex



Posterior interventricular (posterior descending) branch derived from circumflex branch of left coronary artery instead of from right coronary artery



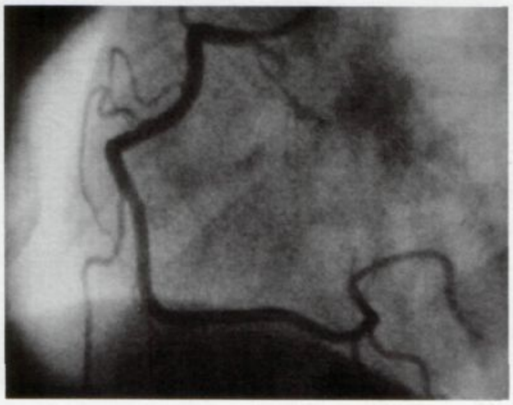
Posterior interventricular (posterior descending) branch absent. Area supplied chiefly by small branches from circumflex branch of left coronary artery and from right coronary artery



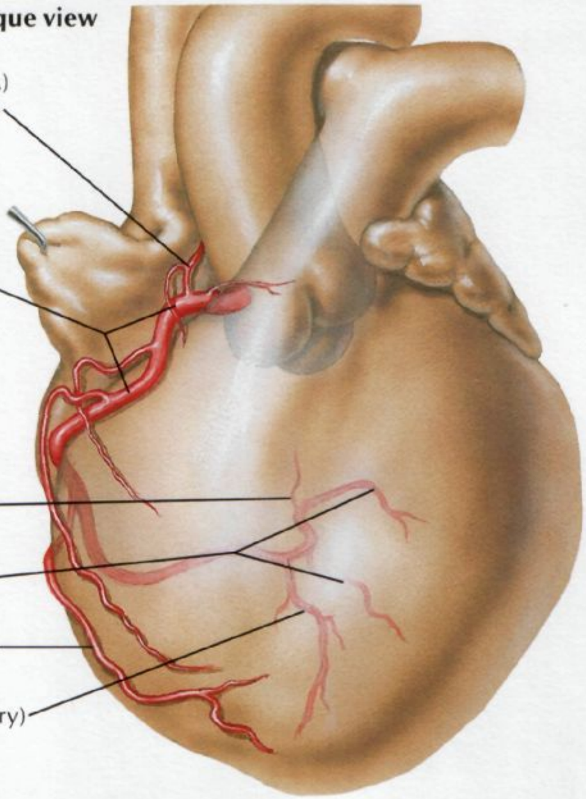
Posterior interventricular (posterior descending) branch absent. Area supplied chiefly by elongated anterior interventricular (left anterior descending) branch curving around apex

Coronary Arteries: Arteriographic Views

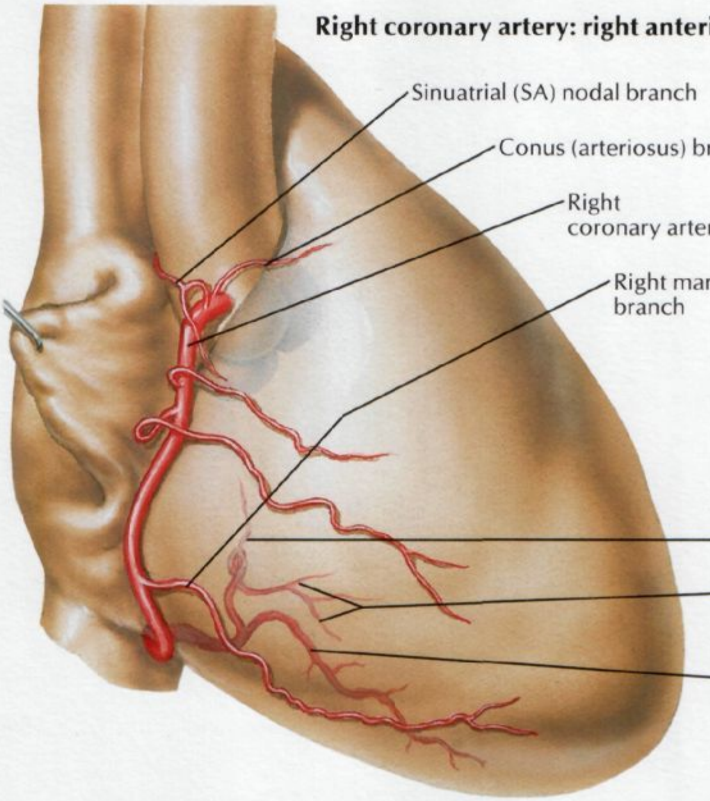
Right coronary artery: left anterior oblique view

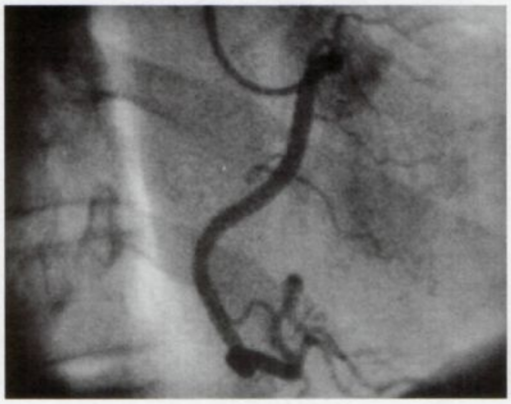


Arteriogram


Sinuatrial (SA) nodal branch
Right coronary artery
Atrioventricular (AV) nodal branch
Branches to back of left ventricle
Right marginal branch
Posterior interventricular branch (posterior descending artery)

Right coronary artery: right anterior oblique view


Sinuatrial (SA) nodal branch
Conus (arteriosus) branch
Right coronary artery
Right marginal branch
Atrioventricular (AV) nodal branch
Right posterolateral branches (to back of left ventricle)
Posterior interventricular branch (posterior descending artery)



Arteriogram

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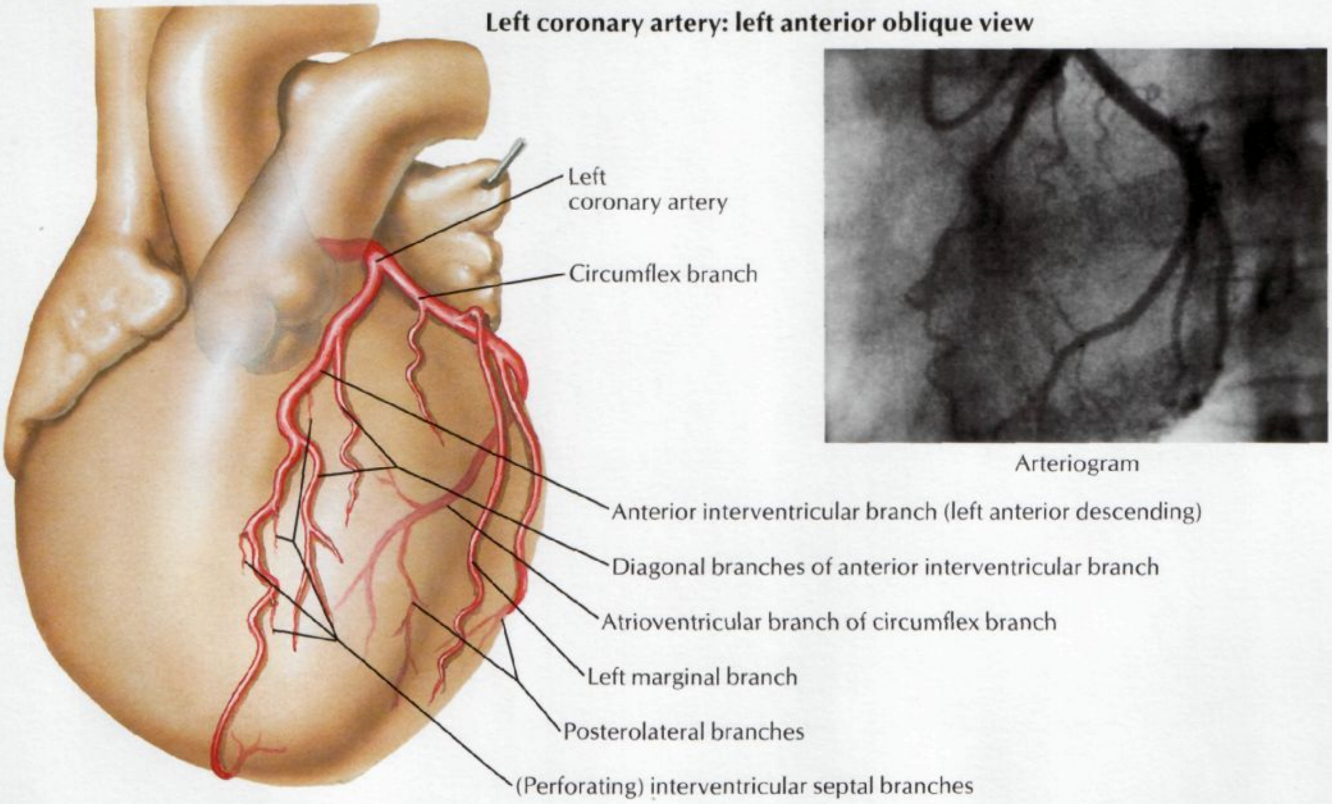
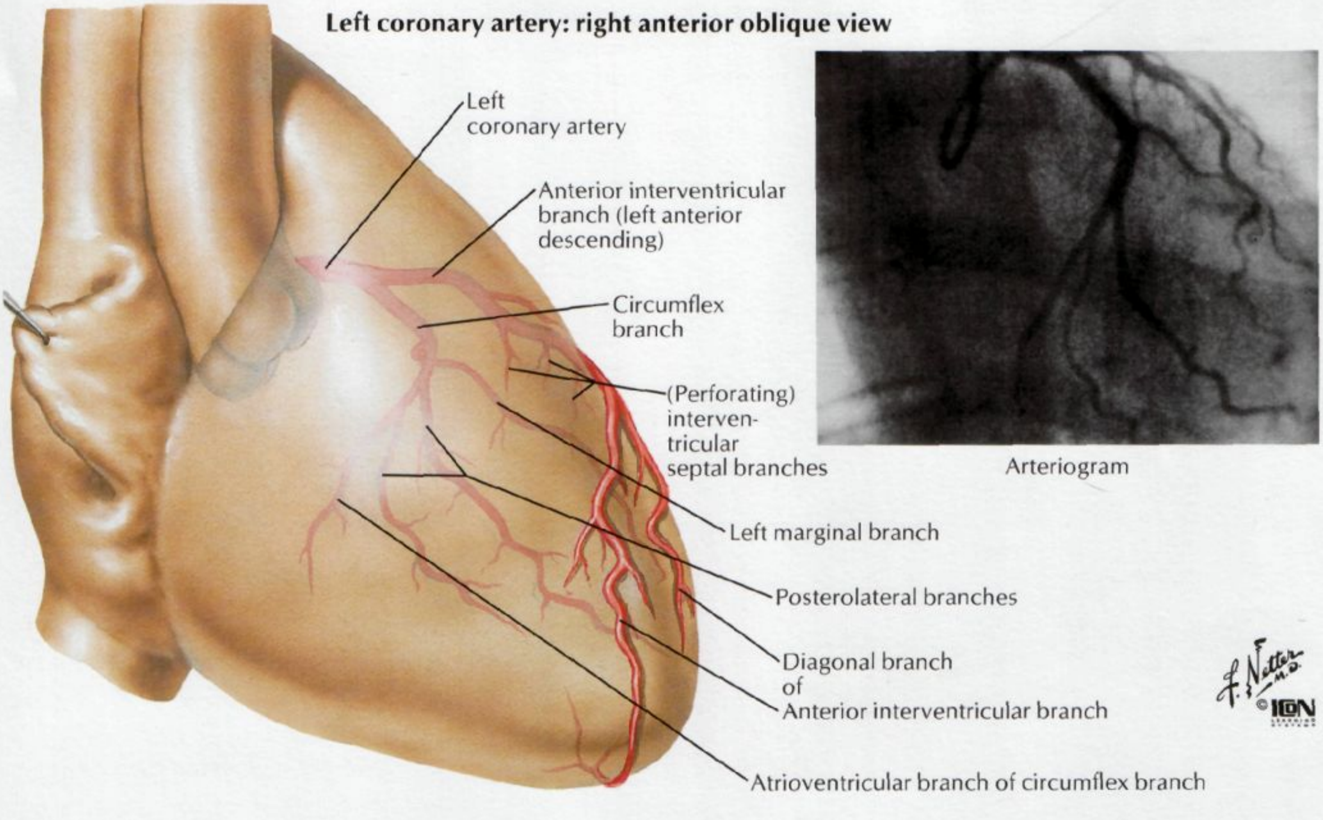
Coronary Arteries: Arteriographic Views (continued)

Left coronary artery: left anterior oblique view


Left coronary artery
Circumflex branch
Anterior interventricular branch (left anterior descending)
Diagonal branches of anterior interventricular branch
Atrioventricular branch of circumflex branch
Left marginal branch
Posterolateral branches
(Perforating) interventricular septal branches

Arteriogram

Left coronary artery: right anterior oblique view


Left coronary artery
Anterior interventricular branch (left anterior descending)
Circumflex branch
(Perforating) interventricular septal branches
Left marginal branch
Posterolateral branches
Diagonal branch of Anterior interventricular branch
Atrioventricular branch of circumflex branch

Arteriogram

F. Netter M.D.
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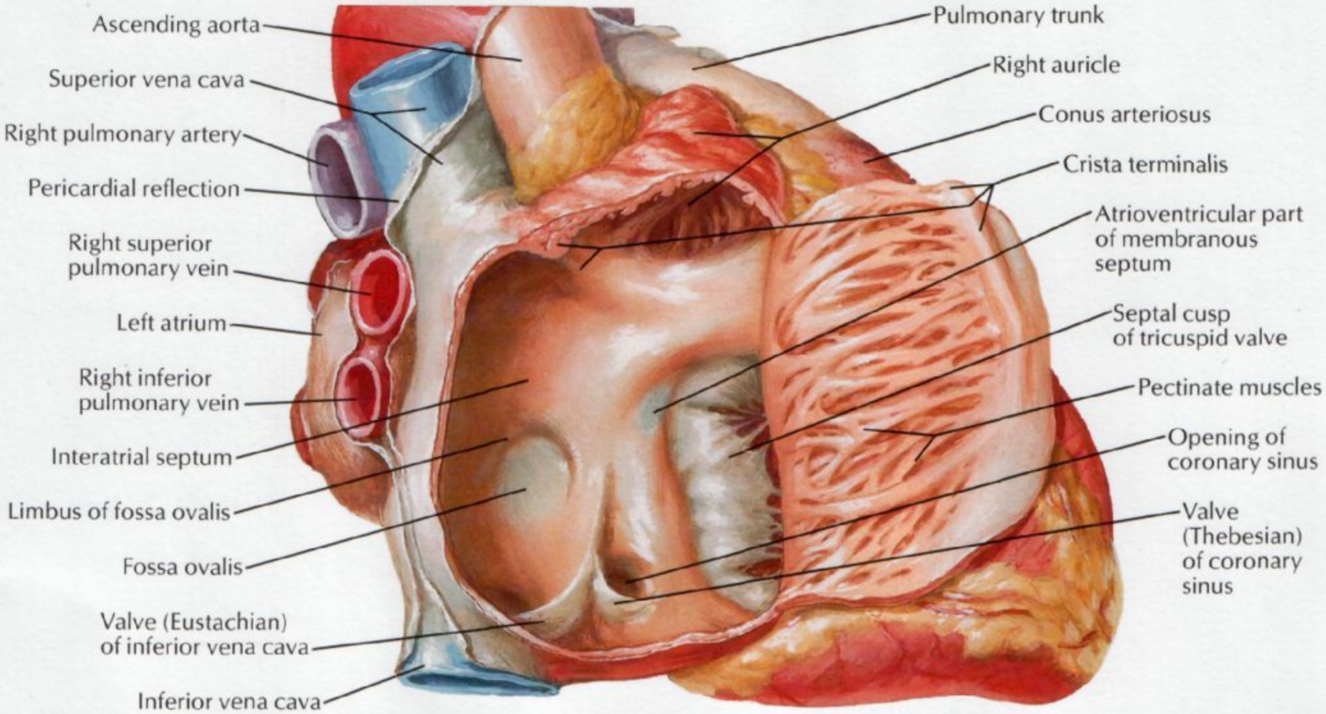
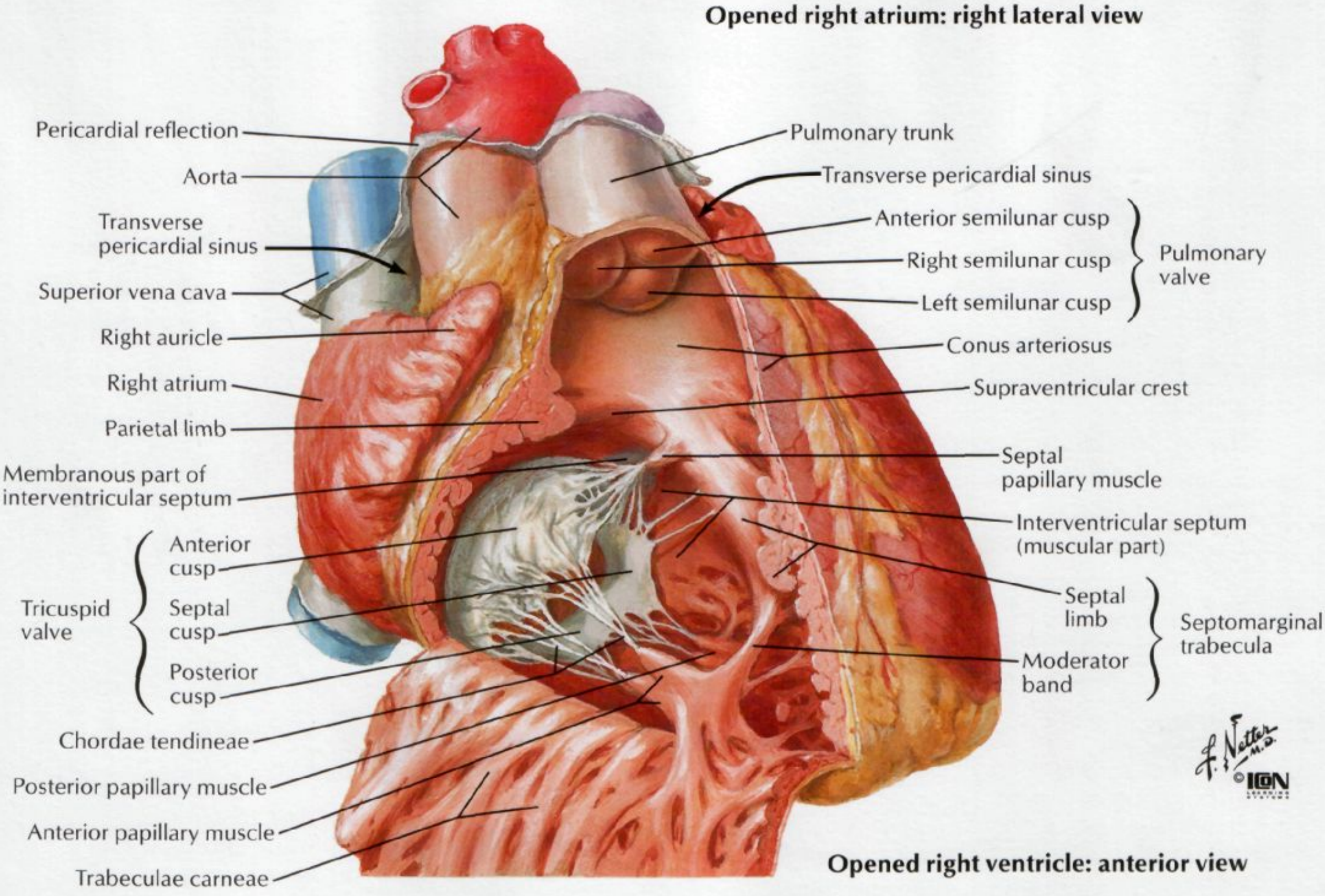
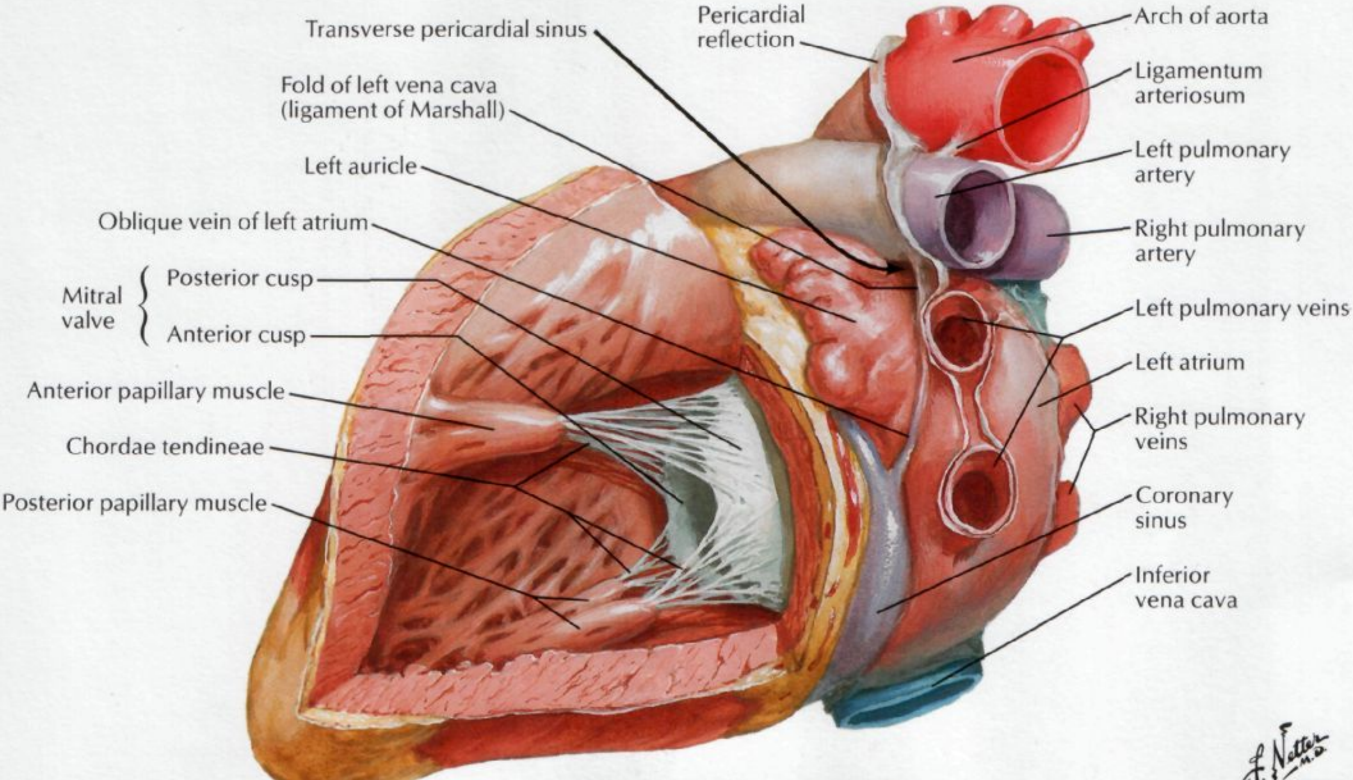


Opened right atrium: right lateral view

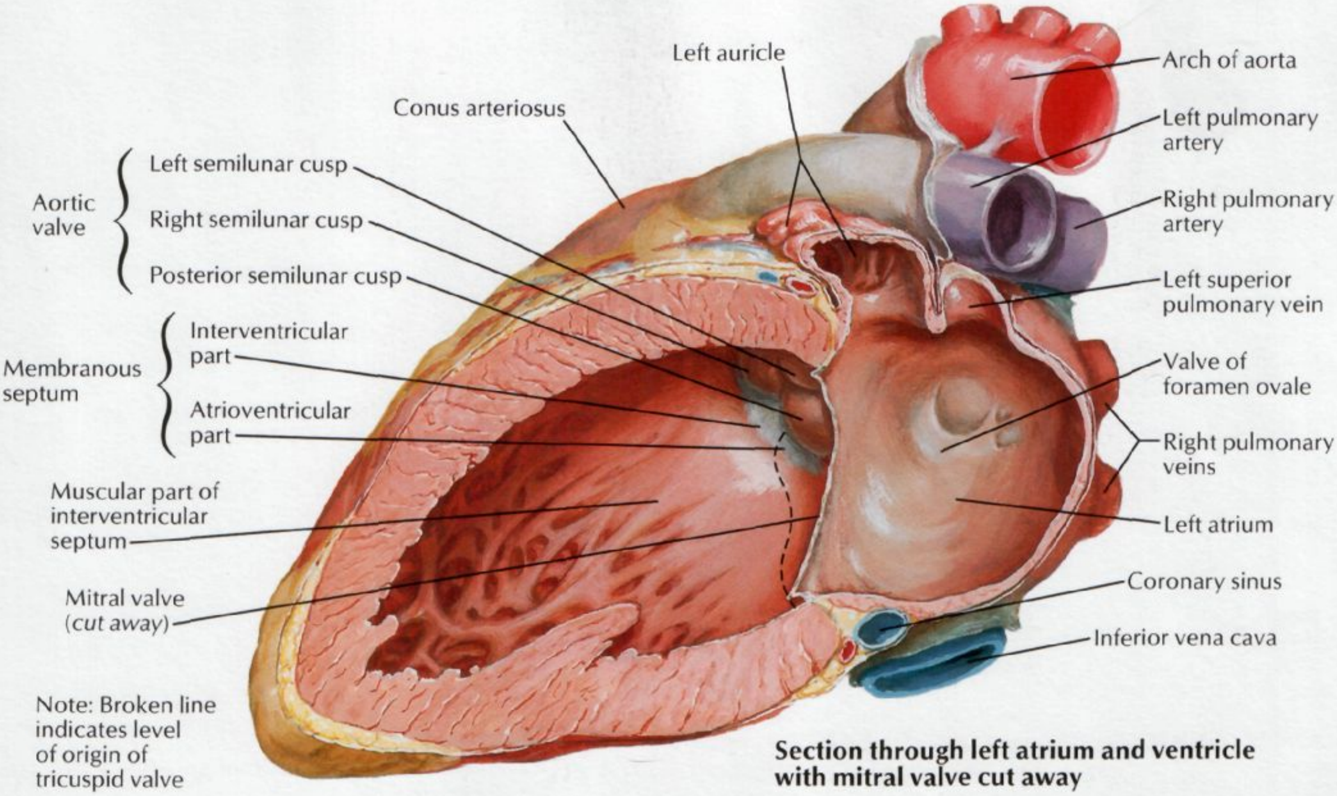


Opened right ventricle: anterior view

Left Atrium and Ventricle



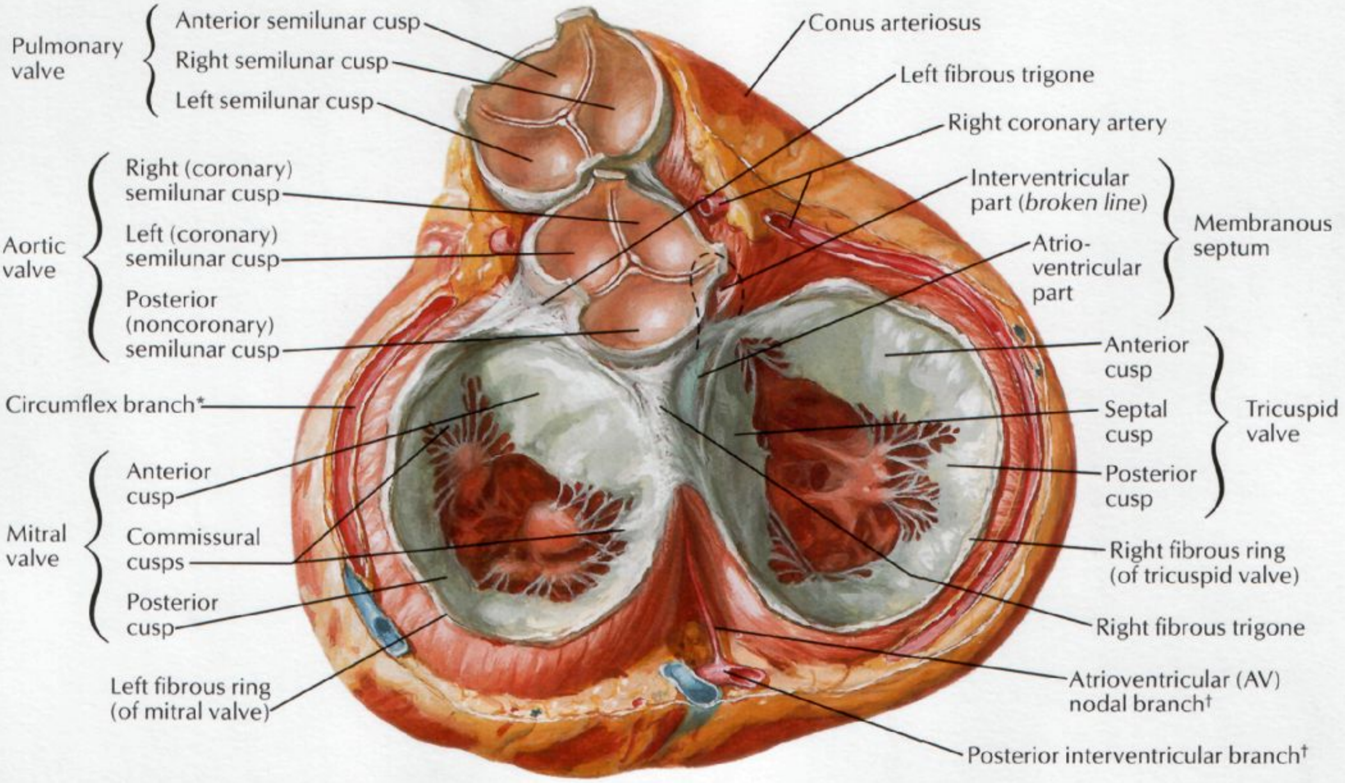
Flap opened in posterolateral wall of left ventricle



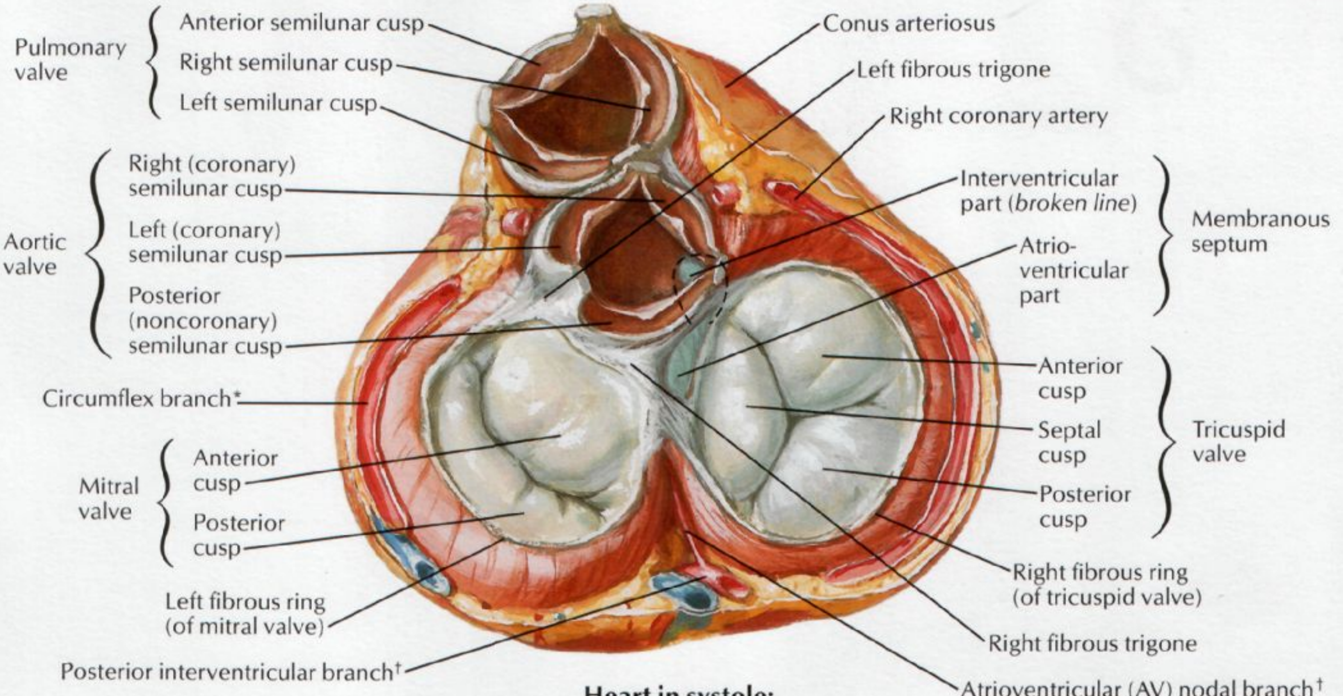
Note: Broken line indicates level of origin of tricuspid valve

Section through left atrium and ventricle with mitral valve cut away

Valves and Fibrous Skeleton of Heart



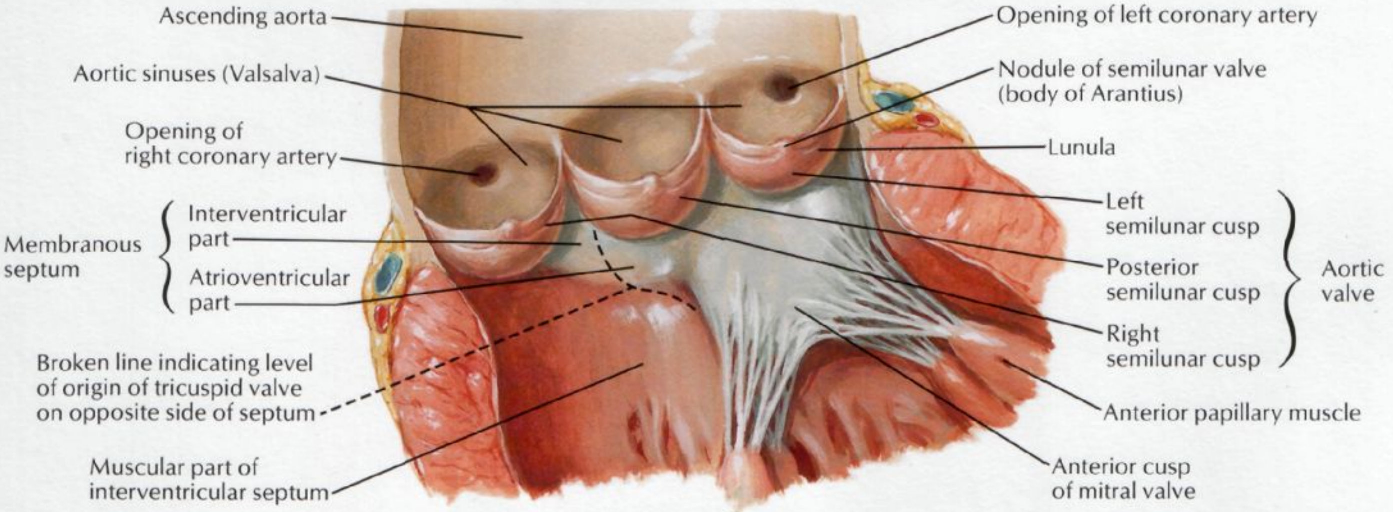
Heart in diastole: viewed from base with atria removed



Heart in systole: viewed from base with atria removed

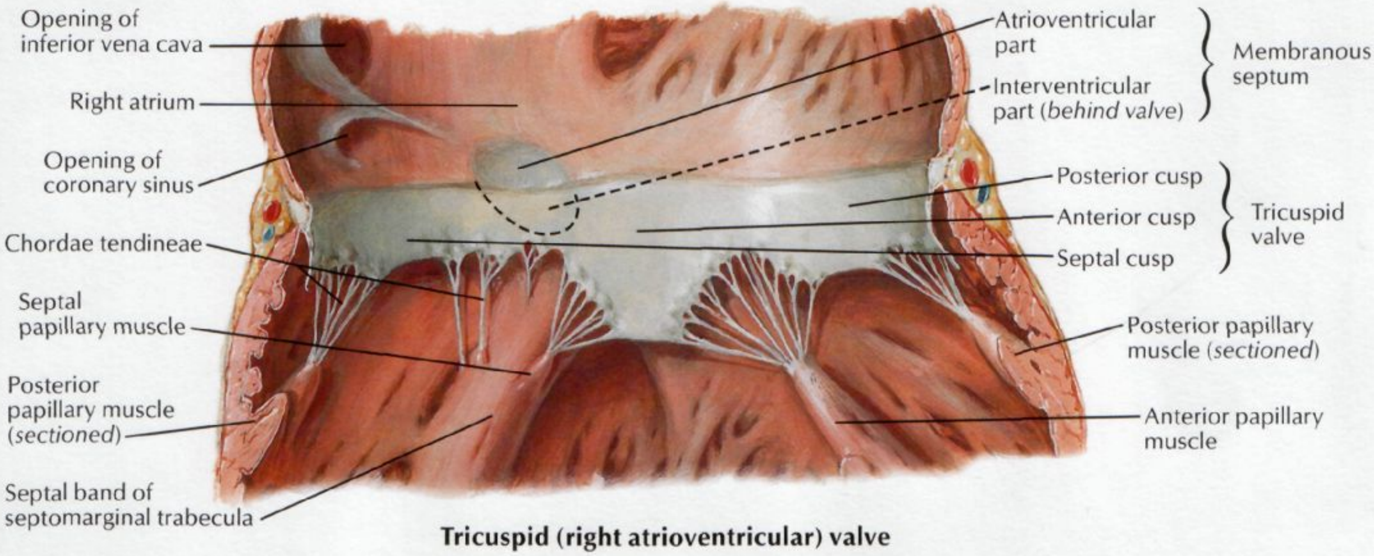
*Of left coronary artery
†Of right coronary artery

Valves and Fibrous Skeleton of Heart (continued)



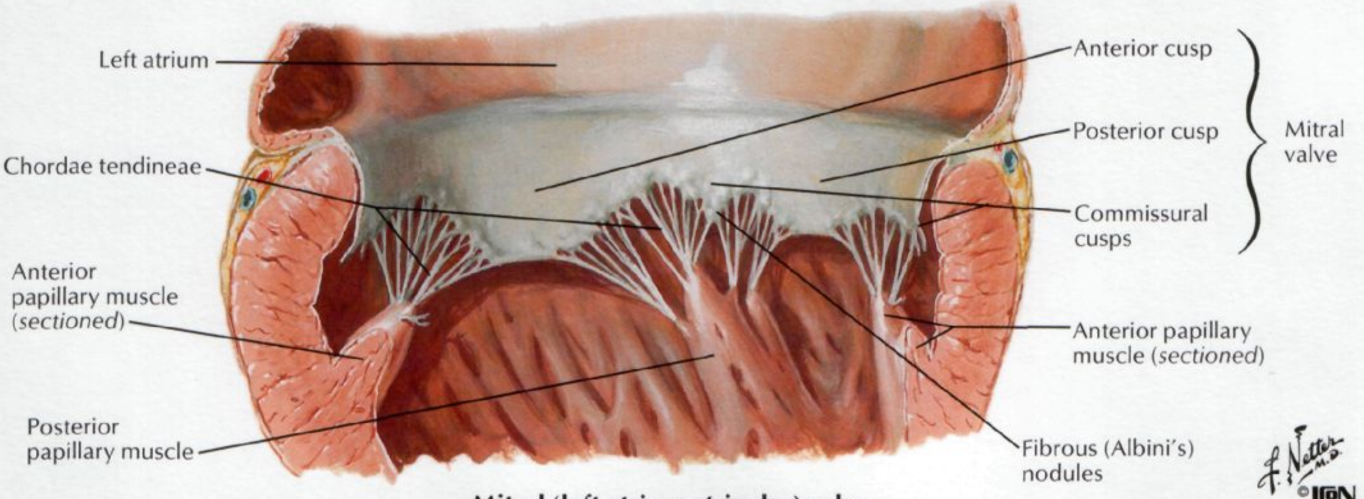
Ascending aorta
Aortic sinuses (Valsalva)
Opening of right coronary artery
Membranous septum
Interventricular part
Atrioventricular part
Broken line indicating level of origin of tricuspid valve on opposite side of septum
Muscular part of interventricular septum
Opening of left coronary artery
Nodule of semilunar valve (body of Arantius)
Lunula
Left semilunar cusp
Posterior semilunar cusp
Right semilunar cusp
Aortic valve
Anterior papillary muscle
Anterior cusp of mitral valve

Aortic valve



Opening of inferior vena cava
Right atrium
Opening of coronary sinus
Chordae tendineae
Septal papillary muscle
Posterior papillary muscle (*sectioned*)
Septal band of septomarginal trabecula
Atrioventricular part
Interventricular part (*behind valve*)
Membranous septum
Posterior cusp
Anterior cusp
Septal cusp
Tricuspid valve
Posterior papillary muscle (*sectioned*)
Anterior papillary muscle

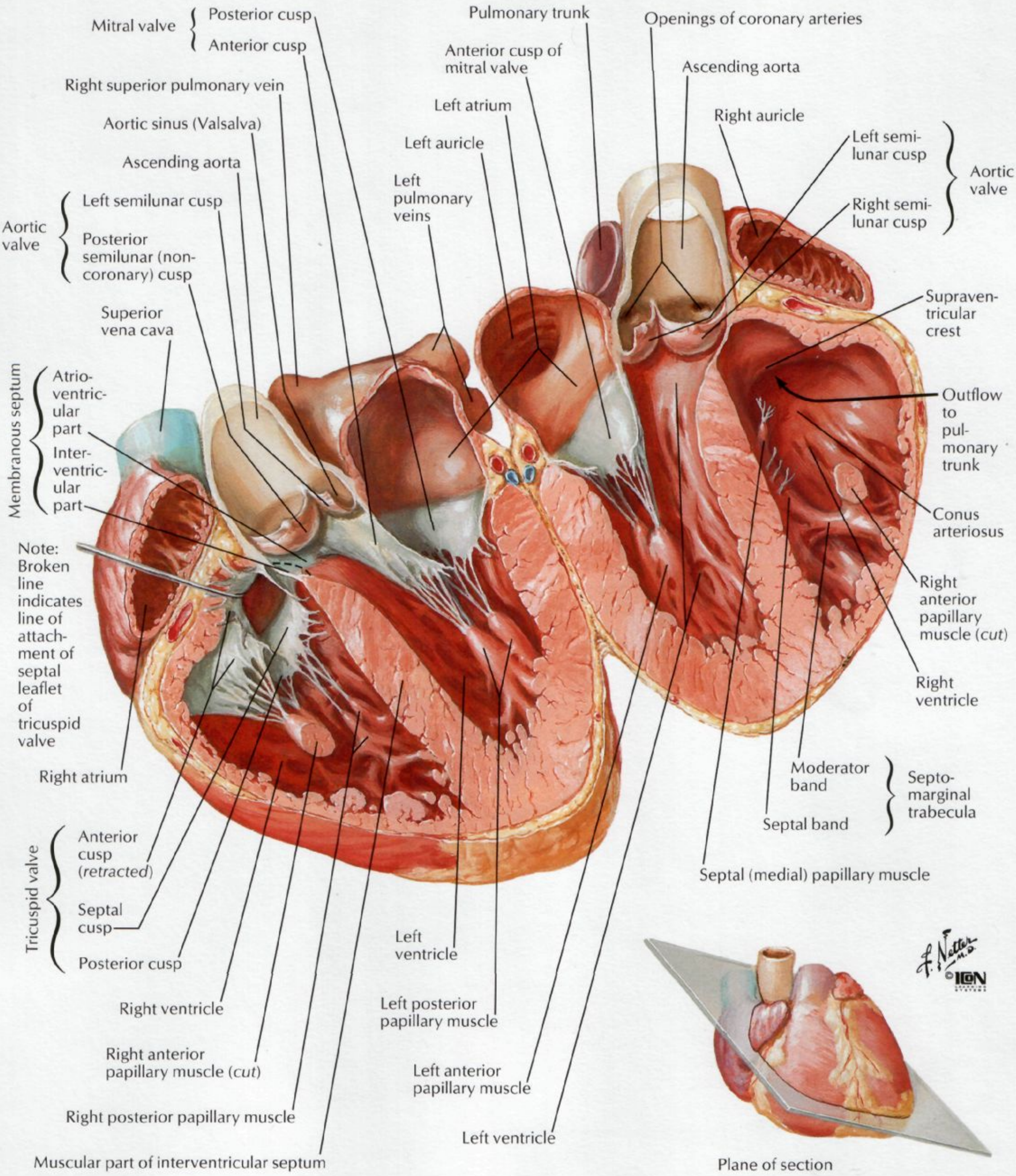
Tricuspid (right atrioventricular) valve



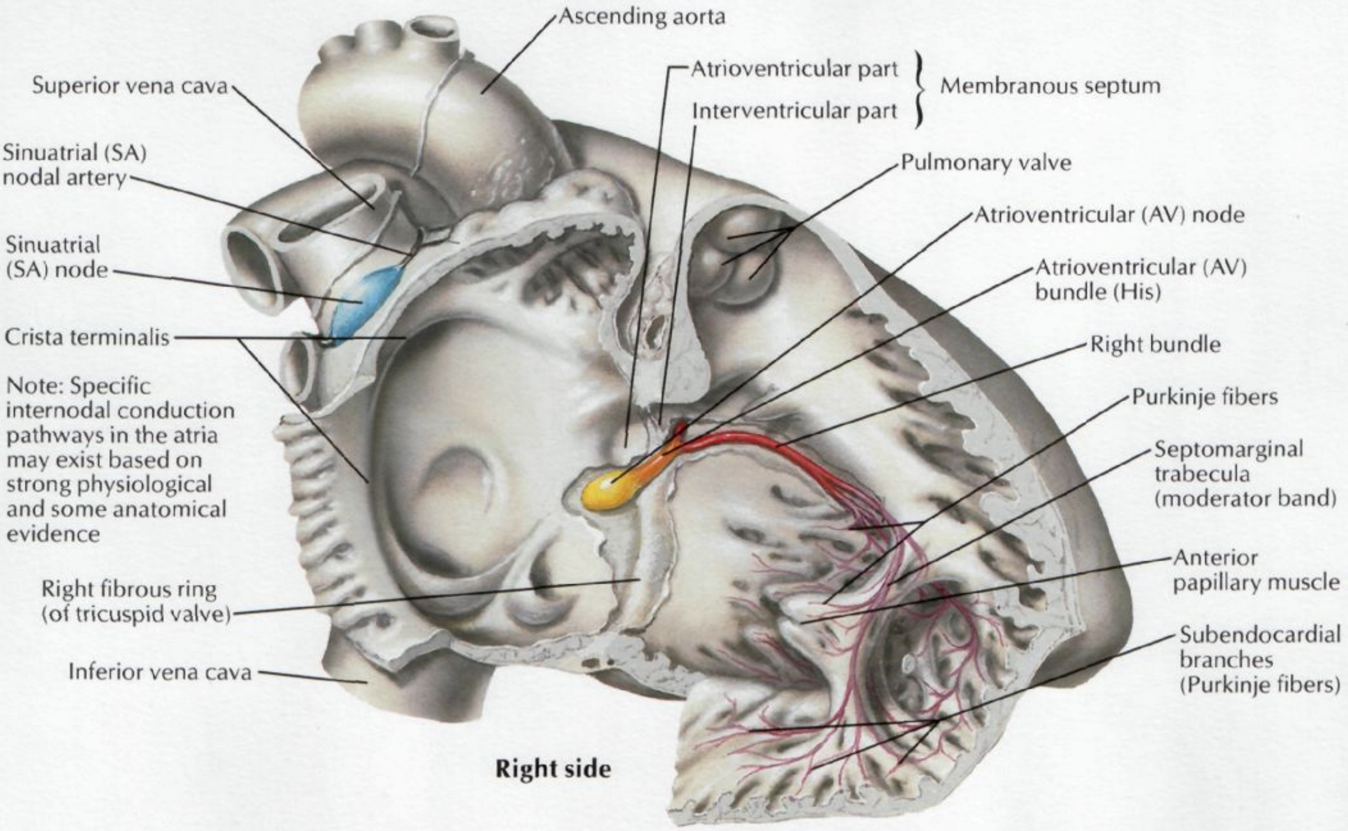
Left atrium
Chordae tendineae
Anterior papillary muscle (*sectioned*)
Posterior papillary muscle
Anterior cusp
Posterior cusp
Commissural cusps
Mitral valve
Anterior papillary muscle (*sectioned*)
Fibrous (Albini's) nodules

Mitral (left atrioventricular) valve

Atria, Ventricles and Interventricular Septum

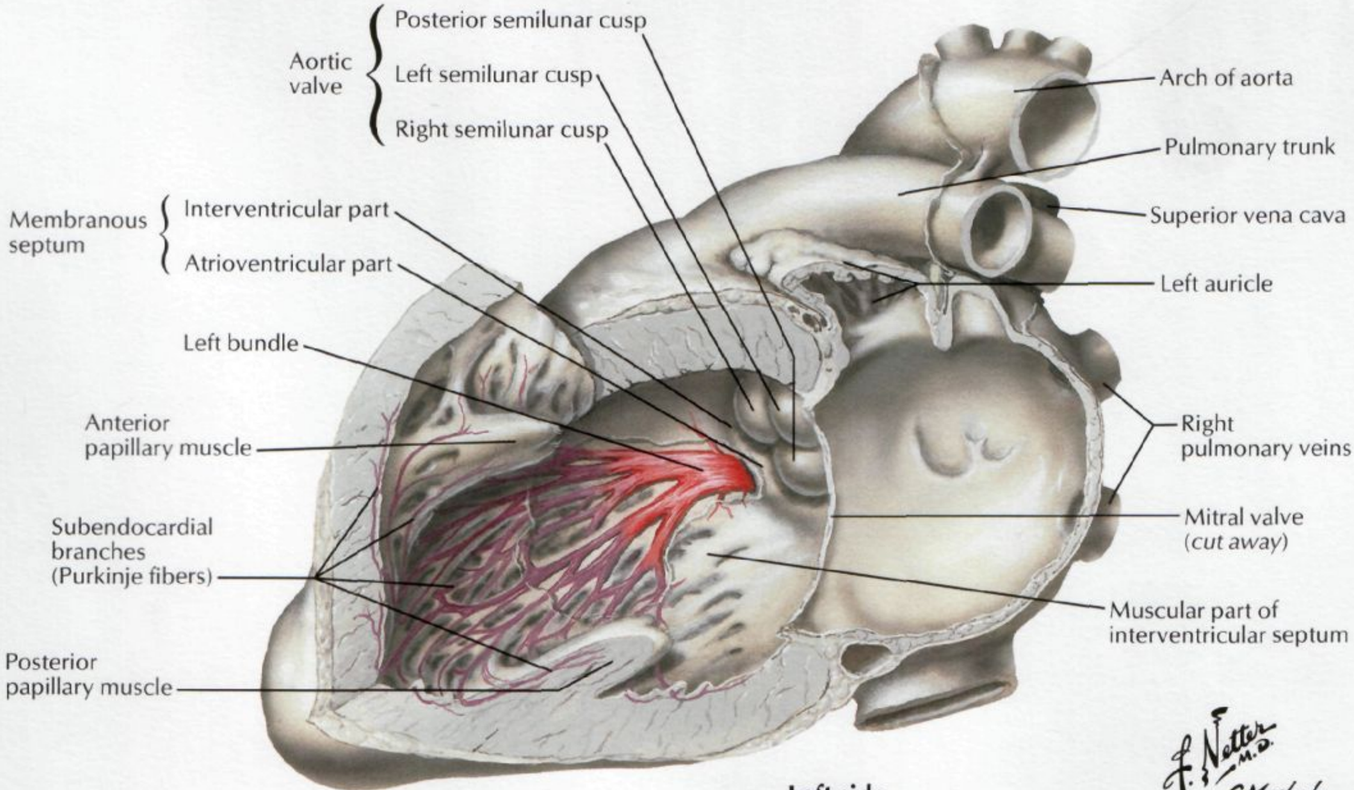


Conducting System of Heart


Ascending aorta
Superior vena cava
Atrioventricular part
Interventricular part
Membranous septum
Sinuatrial (SA) nodal artery
Pulmonary valve
Atrioventricular (AV) node
Sinuatrial (SA) node
Atrioventricular (AV) bundle (His)
Crista terminalis
Right bundle
Purkinje fibers
Septomarginal trabecula (moderator band)
Anterior papillary muscle
Right fibrous ring (of tricuspid valve)
Subendocardial branches (Purkinje fibers)
Inferior vena cava

Note: Specific internodal conduction pathways in the atria may exist based on strong physiological and some anatomical evidence

Right side



Left side

F. Netter M.D.
C. Machado M.D.

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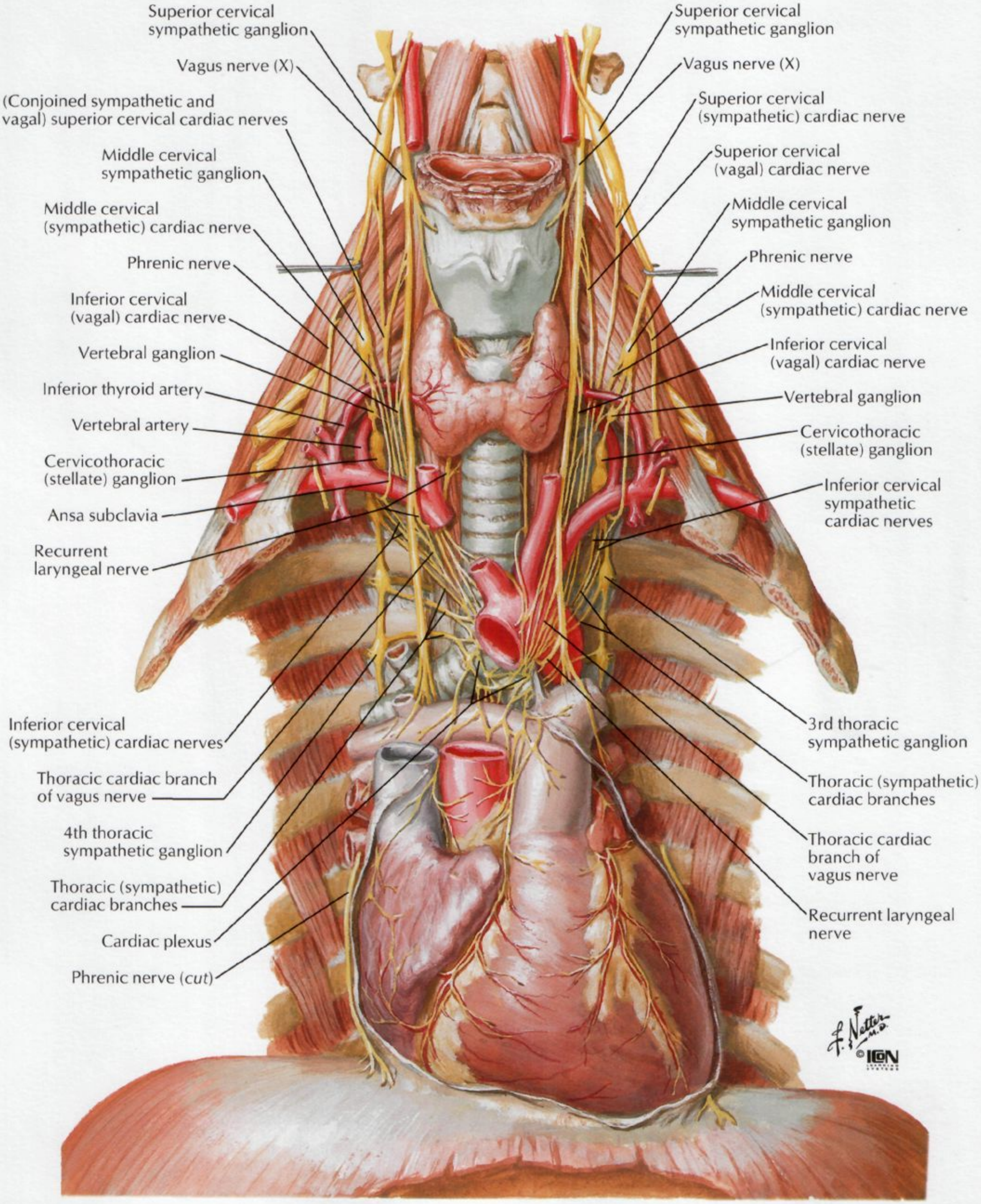
SEE ALSO PLATES 124, 159, 205


Superior cervical sympathetic ganglion
Vagus nerve (X)
(Conjoined sympathetic and vagal) superior cervical cardiac nerves
Middle cervical sympathetic ganglion
Middle cervical (sympathetic) cardiac nerve
Phrenic nerve
Inferior cervical (vagal) cardiac nerve
Vertebral ganglion
Inferior thyroid artery
Vertebral artery
Cervicothoracic (stellate) ganglion
Ansa subclavia
Recurrent laryngeal nerve
Inferior cervical (sympathetic) cardiac nerves
Thoracic cardiac branch of vagus nerve
4th thoracic sympathetic ganglion
Thoracic (sympathetic) cardiac branches
Cardiac plexus
Phrenic nerve (cut)
Superior cervical sympathetic ganglion
Vagus nerve (X)
Superior cervical (sympathetic) cardiac nerve
Superior cervical (vagal) cardiac nerve
Middle cervical sympathetic ganglion
Phrenic nerve
Middle cervical (sympathetic) cardiac nerve
Inferior cervical (vagal) cardiac nerve
Vertebral ganglion
Cervicothoracic (stellate) ganglion
Inferior cervical sympathetic cardiac nerves
3rd thoracic sympathetic ganglion
Thoracic (sympathetic) cardiac branches
Thoracic cardiac branch of vagus nerve
Recurrent laryngeal nerve
F. Netter M.D.
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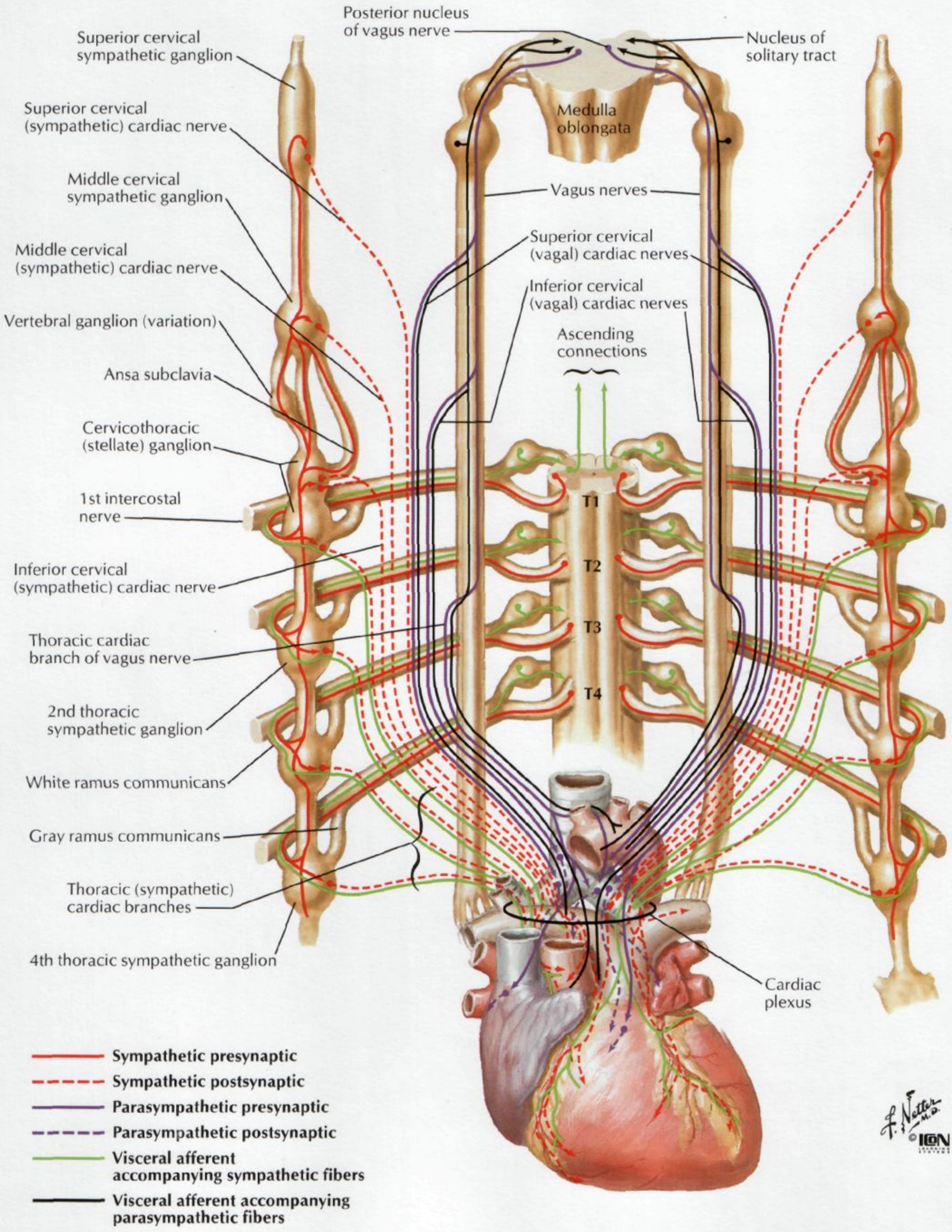
Innervation of Heart: Schema

SEE ALSO PLATES 120, 160


Posterior nucleus of vagus nerve
Nucleus of solitary tract
Superior cervical sympathetic ganglion
Superior cervical (sympathetic) cardiac nerve
Medulla oblongata
Middle cervical sympathetic ganglion
Vagus nerves
Middle cervical (sympathetic) cardiac nerve
Superior cervical (vagal) cardiac nerves
Inferior cervical (vagal) cardiac nerves
Vertebral ganglion (variation)
Ascending connections
Ansa subclavia
Cervicothoracic (stellate) ganglion
1st intercostal nerve
T1
T2
Inferior cervical (sympathetic) cardiac nerve
T3
Thoracic cardiac branch of vagus nerve
T4
2nd thoracic sympathetic ganglion
White ramus communicans
Gray ramus communicans
Thoracic (sympathetic) cardiac branches
4th thoracic sympathetic ganglion
Cardiac plexus
Sympathetic presynaptic
Sympathetic postsynaptic
Parasympathetic presynaptic
Parasympathetic postsynaptic
Visceral afferent accompanying sympathetic fibers
Visceral afferent accompanying parasympathetic fibers
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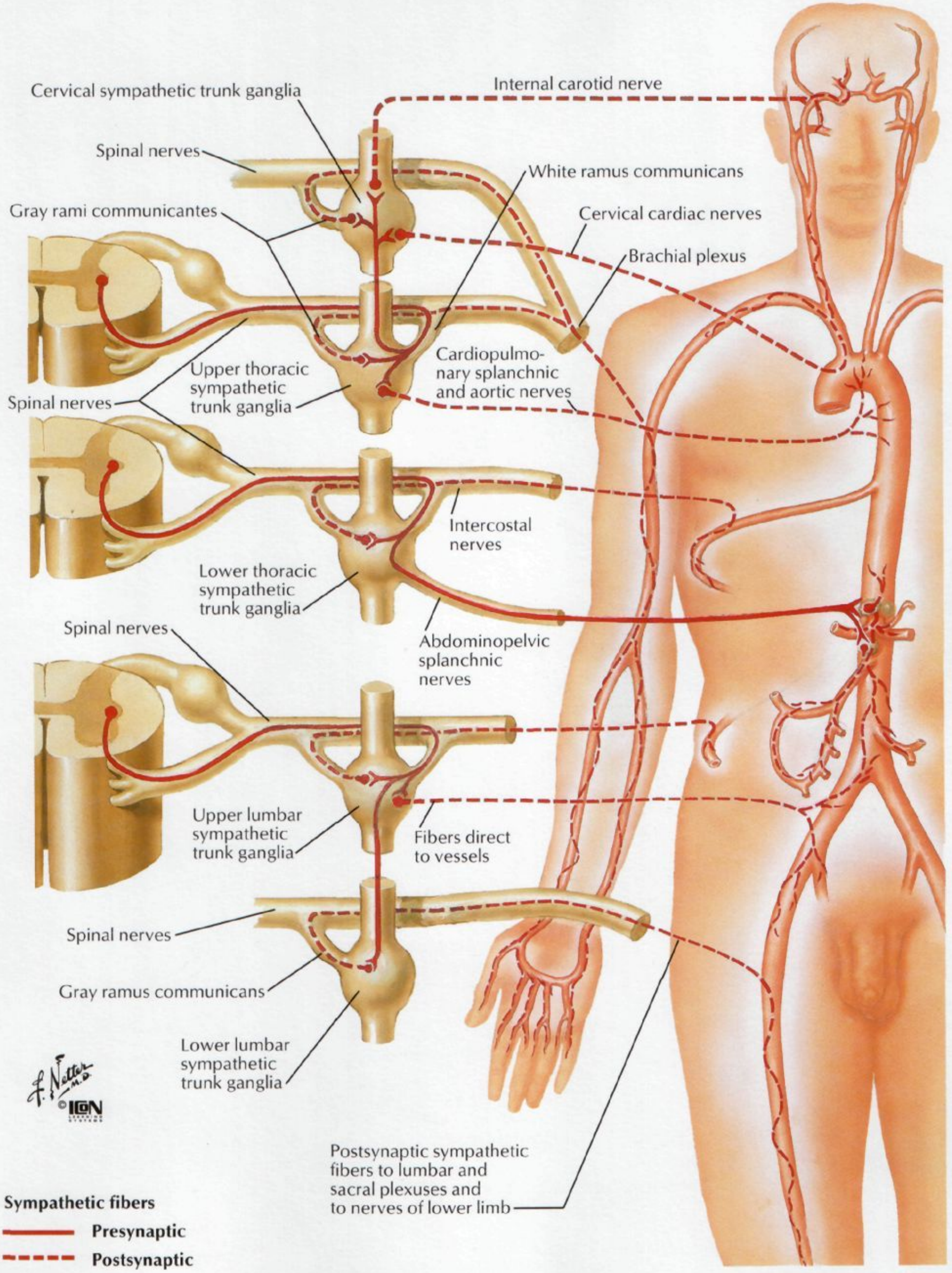
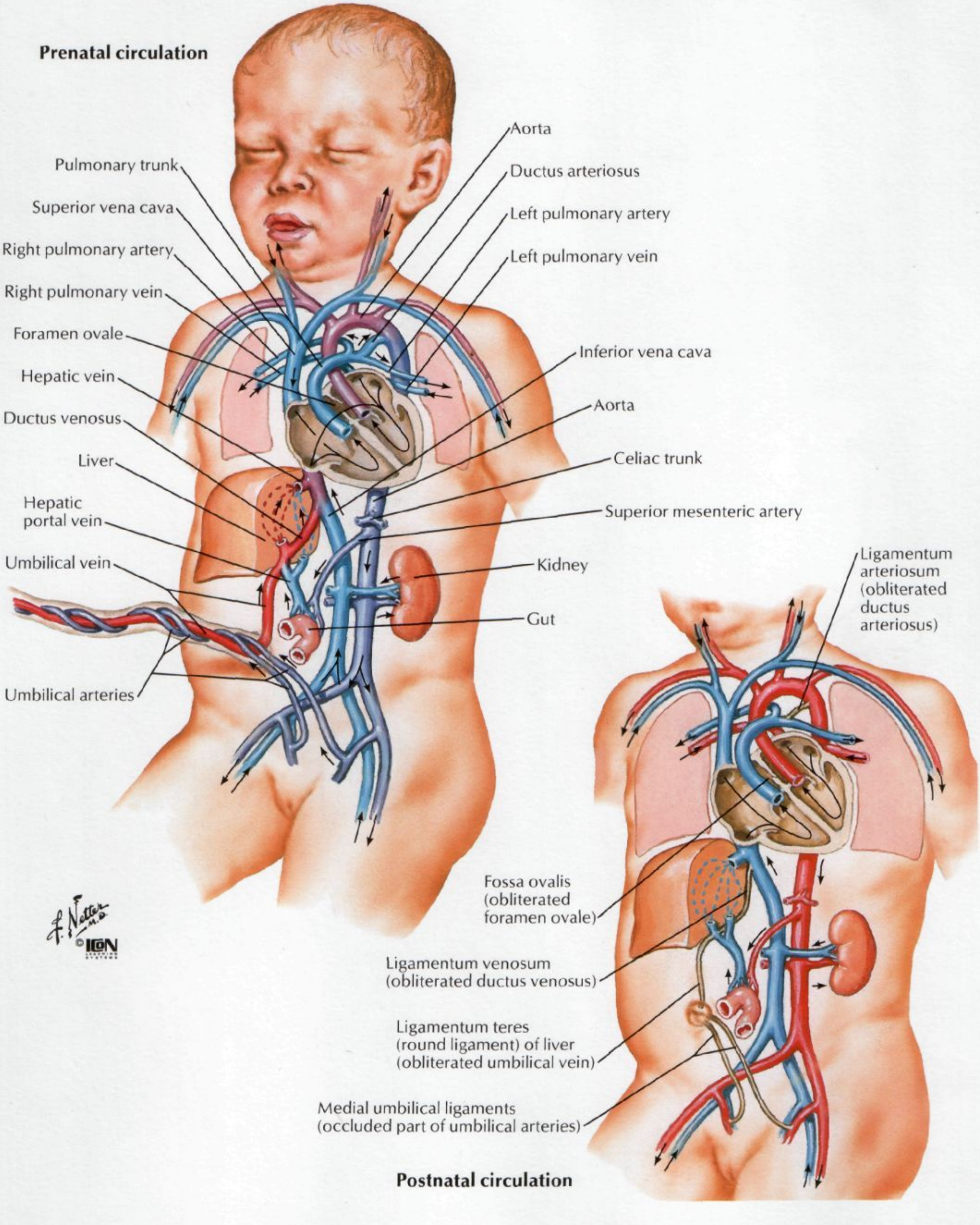
Innervation of Blood Vessels: Schema

SEE ALSO PLATE 160


Cervical sympathetic trunk ganglia
Internal carotid nerve
Spinal nerves
White ramus communicans
Gray rami communicantes
Cervical cardiac nerves
Brachial plexus
Cardiopulmonary splanchnic and aortic nerves
Upper thoracic sympathetic trunk ganglia
Spinal nerves
Intercostal nerves
Lower thoracic sympathetic trunk ganglia
Spinal nerves
Abdominopelvic splanchnic nerves
Upper lumbar sympathetic trunk ganglia
Fibers direct to vessels
Spinal nerves
Gray ramus communicans
Lower lumbar sympathetic trunk ganglia
Postsynaptic sympathetic fibers to lumbar and sacral plexuses and to nerves of lower limb
Sympathetic fibers
— **Presynaptic**
- - - - **Postsynaptic**

Prenatal and Postnatal Circulation

FOR OCCLUDED PART OF UMBILICAL VESSELS SEE PLATE 245



Prenatal circulation

Pulmonary trunk
Superior vena cava
Right pulmonary artery
Right pulmonary vein
Foramen ovale
Hepatic vein
Ductus venosus
Liver
Hepatic portal vein
Umbilical vein
Umbilical arteries
Aorta
Ductus arteriosus
Left pulmonary artery
Left pulmonary vein
Inferior vena cava
Aorta
Celiac trunk
Superior mesenteric artery
Kidney
Gut
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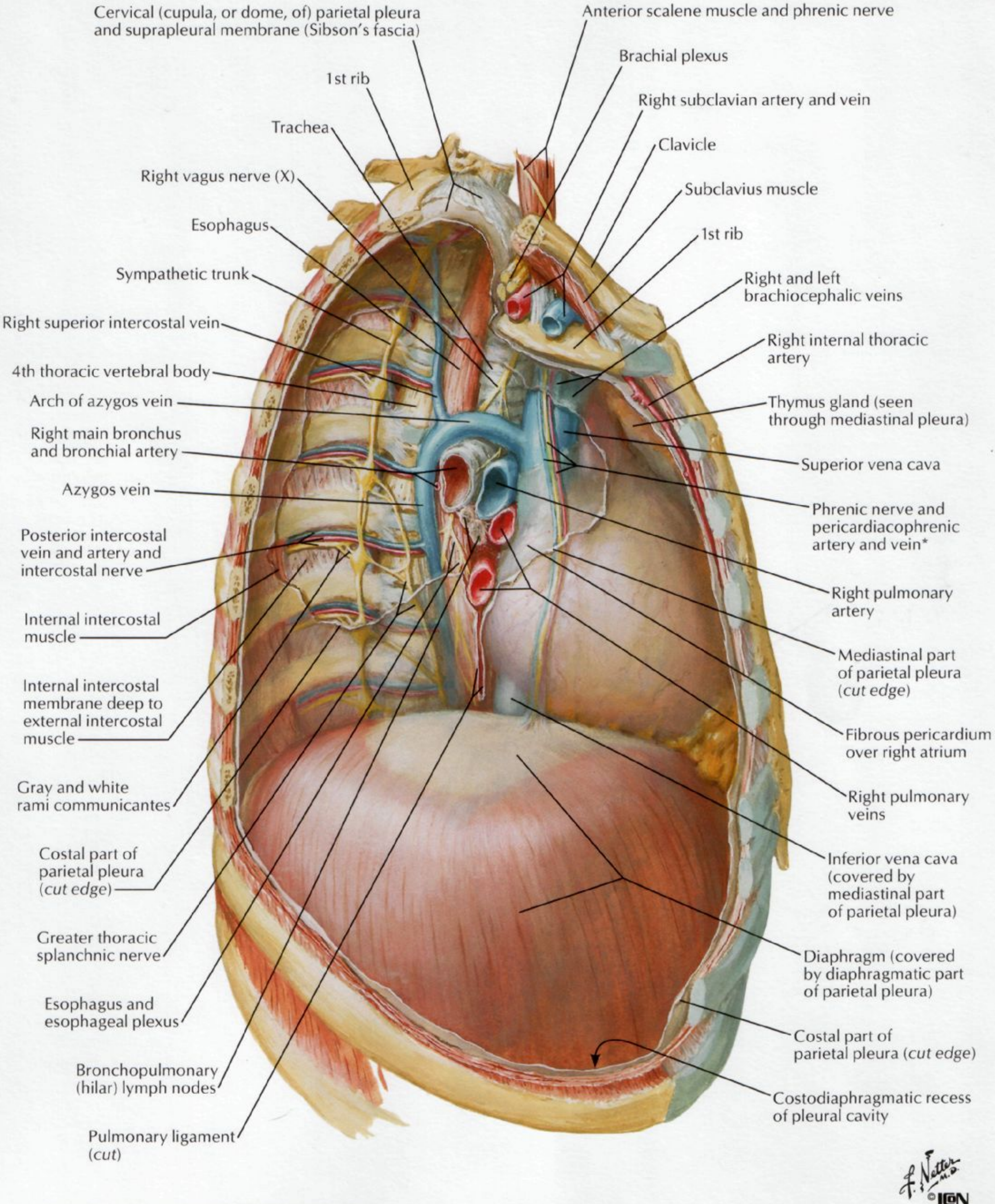
Postnatal circulation

Ligamentum arteriosum (obliterated ductus arteriosus)
Fossa ovalis (obliterated foramen ovale)
Ligamentum venosum (obliterated ductus venosus)
Ligamentum teres (round ligament) of liver (obliterated umbilical vein)
Medial umbilical ligaments (occluded part of umbilical arteries)

Mediastinum: Right Lateral View


Cervical (cupula, or dome, of) parietal pleura and suprapleural membrane (Sibson's fascia)
1st rib
Trachea
Right vagus nerve (X)
Esophagus
Sympathetic trunk
Right superior intercostal vein
4th thoracic vertebral body
Arch of azygos vein
Right main bronchus and bronchial artery
Azygos vein
Posterior intercostal vein and artery and intercostal nerve
Internal intercostal muscle
Internal intercostal membrane deep to external intercostal muscle
Gray and white rami communicantes
Costal part of parietal pleura (*cut edge*)
Greater thoracic splanchnic nerve
Esophagus and esophageal plexus
Bronchopulmonary (hilar) lymph nodes
Pulmonary ligament (*cut*)
Anterior scalene muscle and phrenic nerve
Brachial plexus
Right subclavian artery and vein
Clavicle
Subclavius muscle
1st rib
Right and left brachiocephalic veins
Right internal thoracic artery
Thymus gland (seen through mediastinal pleura)
Superior vena cava
Phrenic nerve and pericardiacophrenic artery and vein*
Right pulmonary artery
Mediastinal part of parietal pleura (*cut edge*)
Fibrous pericardium over right atrium
Right pulmonary veins
Inferior vena cava (covered by mediastinal part of parietal pleura)
Diaphragm (covered by diaphragmatic part of parietal pleura)
Costal part of parietal pleura (*cut edge*)
Costodiaphragmatic recess of pleural cavity
F. Netter M.D.
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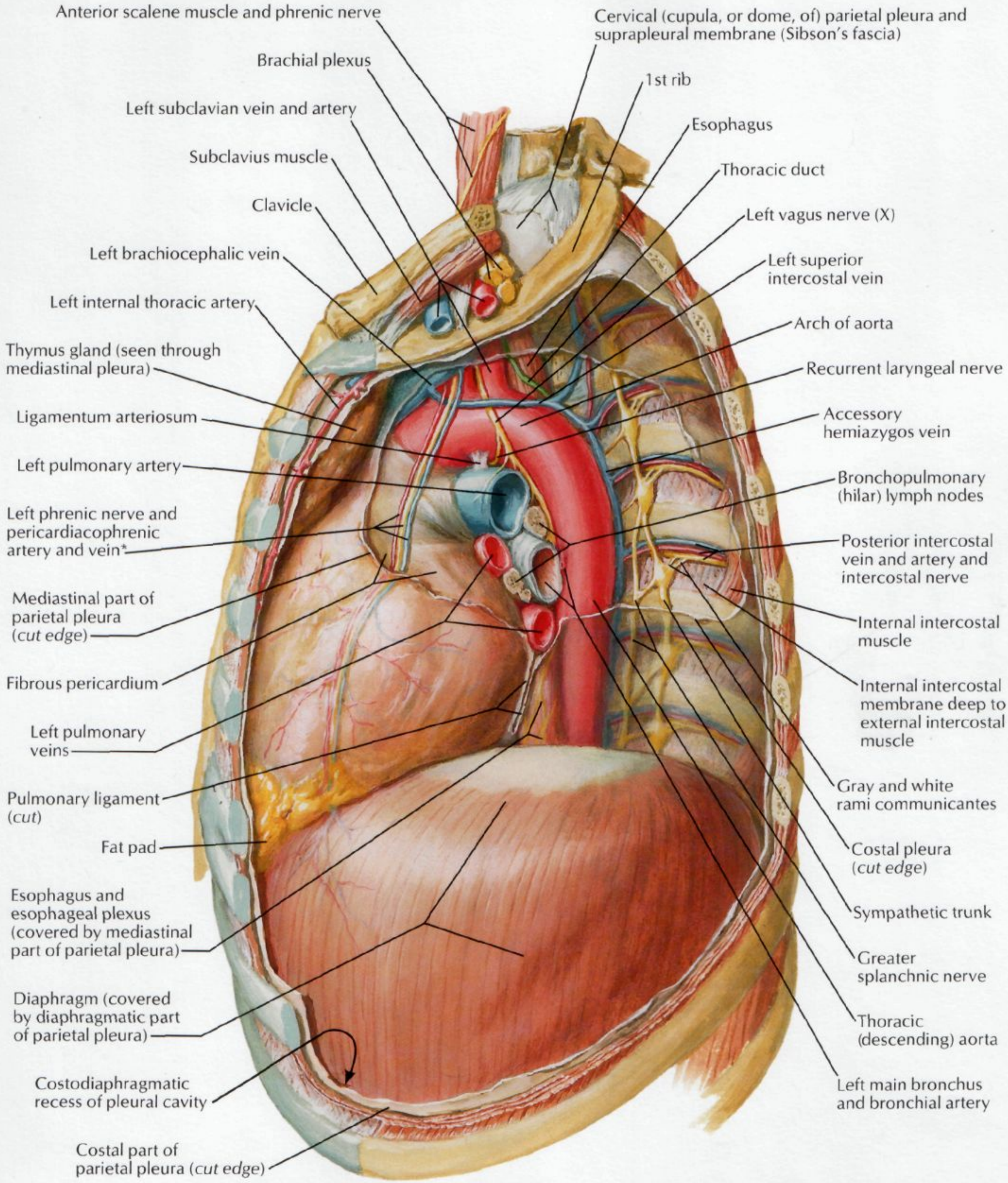
*Nerve and vessels commonly run independently

Mediastinum: Left Lateral View


Anterior scalene muscle and phrenic nerve
Brachial plexus
Left subclavian vein and artery
Subclavius muscle
Clavicle
Left brachiocephalic vein
Left internal thoracic artery
Thymus gland (seen through mediastinal pleura)
Ligamentum arteriosum
Left pulmonary artery
Left phrenic nerve and pericardiacophrenic artery and vein*
Mediastinal part of parietal pleura (*cut edge*)
Fibrous pericardium
Left pulmonary veins
Pulmonary ligament (*cut*)
Fat pad
Esophagus and esophageal plexus (covered by mediastinal part of parietal pleura)
Diaphragm (covered by diaphragmatic part of parietal pleura)
Costodiaphragmatic recess of pleural cavity
Costal part of parietal pleura (*cut edge*)
Cervical (cupula, or dome, of) parietal pleura and suprapleural membrane (Sibson's fascia)
1st rib
Esophagus
Thoracic duct
Left vagus nerve (X)
Left superior intercostal vein
Arch of aorta
Recurrent laryngeal nerve
Accessory hemiazygos vein
Bronchopulmonary (hilar) lymph nodes
Posterior intercostal vein and artery and intercostal nerve
Internal intercostal muscle
Internal intercostal membrane deep to external intercostal muscle
Gray and white rami communicantes
Costal pleura (*cut edge*)
Sympathetic trunk
Greater splanchnic nerve
Thoracic (descending) aorta
Left main bronchus and bronchial artery
F. Netter M.D.
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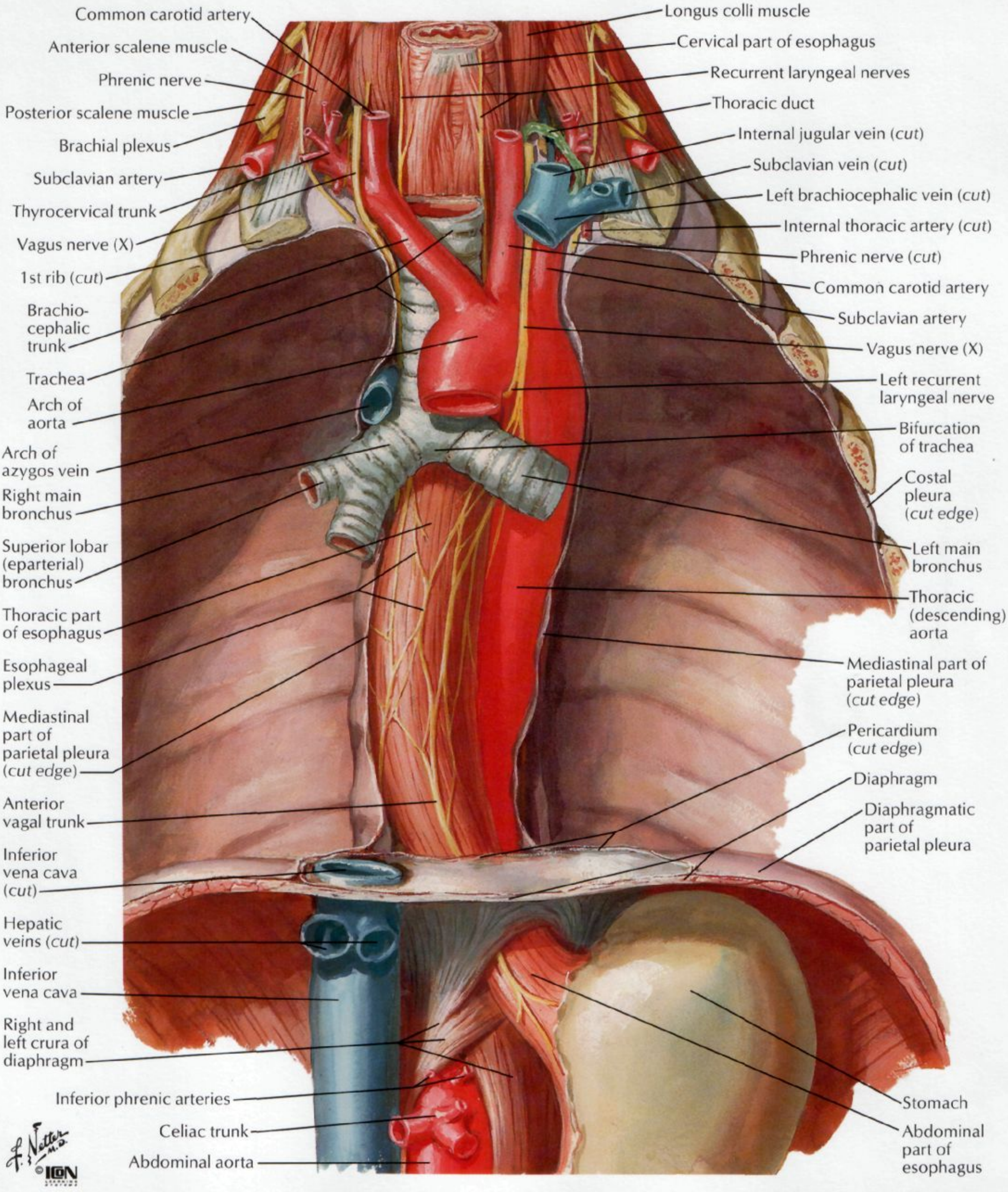
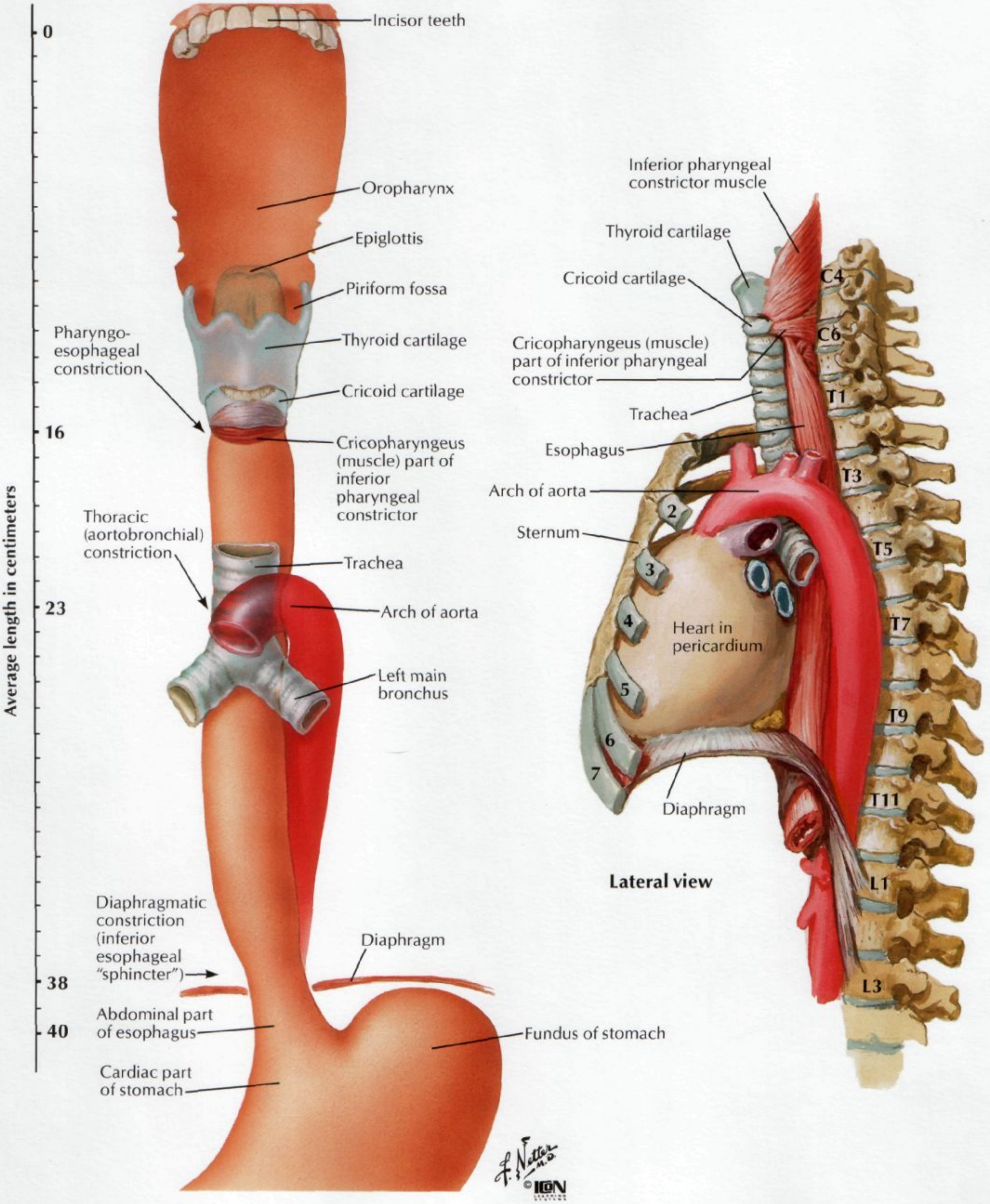
*Nerve and vessels commonly run independently

Esophagus In Situ



Topography and Constrictions of Esophagus


Average length in centimeters
0
16
23
38
40
Incisor teeth
Oropharynx
Epiglottis
Piriform fossa
Pharyngo-esophageal constriction
Thyroid cartilage
Cricoid cartilage
Cricopharyngeus (muscle) part of inferior pharyngeal constrictor
Thoracic (aortobronchial) constriction
Trachea
Arch of aorta
Left main bronchus
Diaphragmatic constriction (inferior esophageal "sphincter")
Diaphragm
Abdominal part of esophagus
Fundus of stomach
Cardiac part of stomach
Inferior pharyngeal constrictor muscle
Thyroid cartilage
Cricoid cartilage
Cricopharyngeus (muscle) part of inferior pharyngeal constrictor
Trachea
Esophagus
Arch of aorta
Sternum
Heart in pericardium
Diaphragm
C4
C6
T1
T3
T5
T7
T9
T11
L1
L3
2
3
4
5
6
7
Lateral view
F. Netter M.D.
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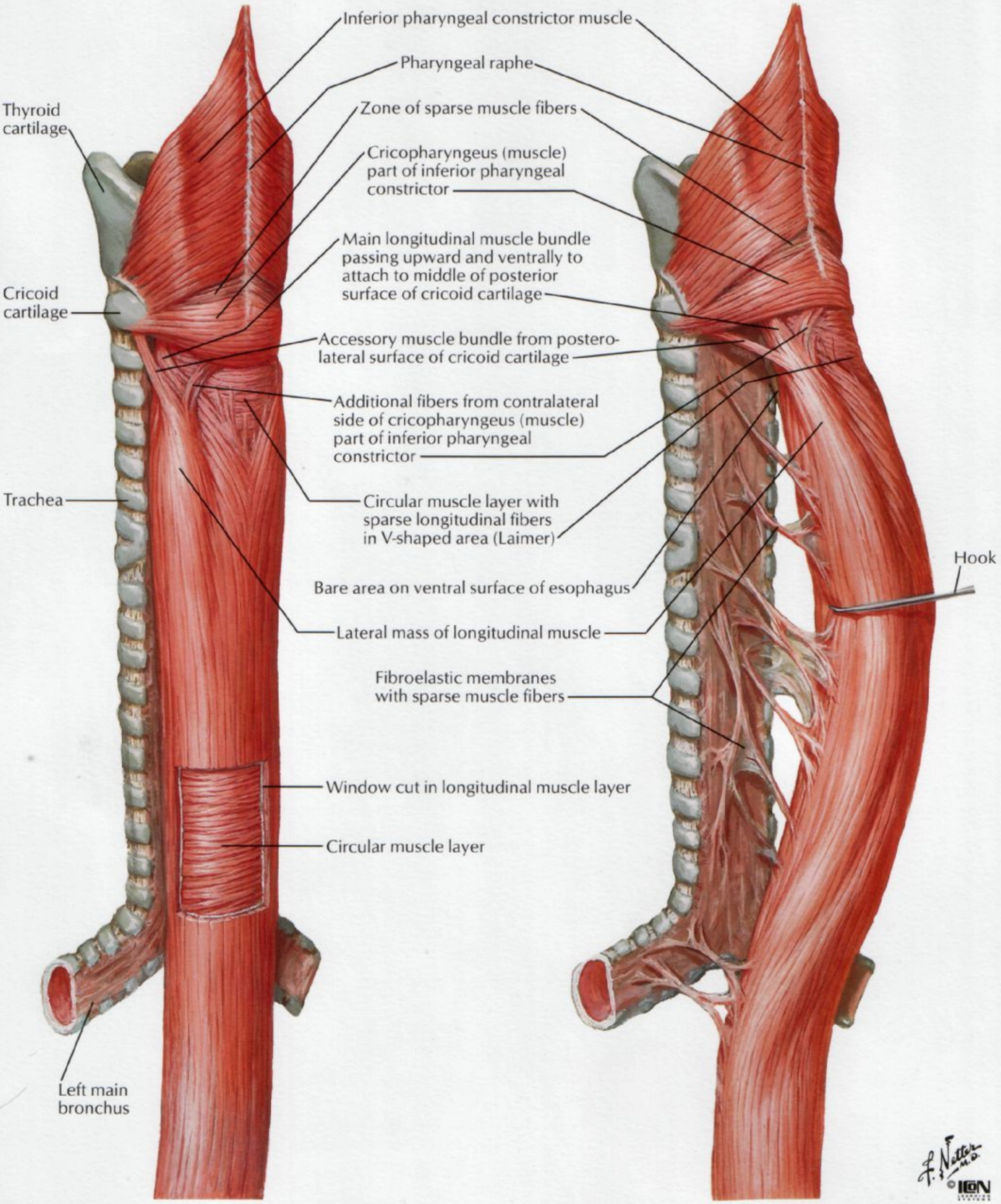
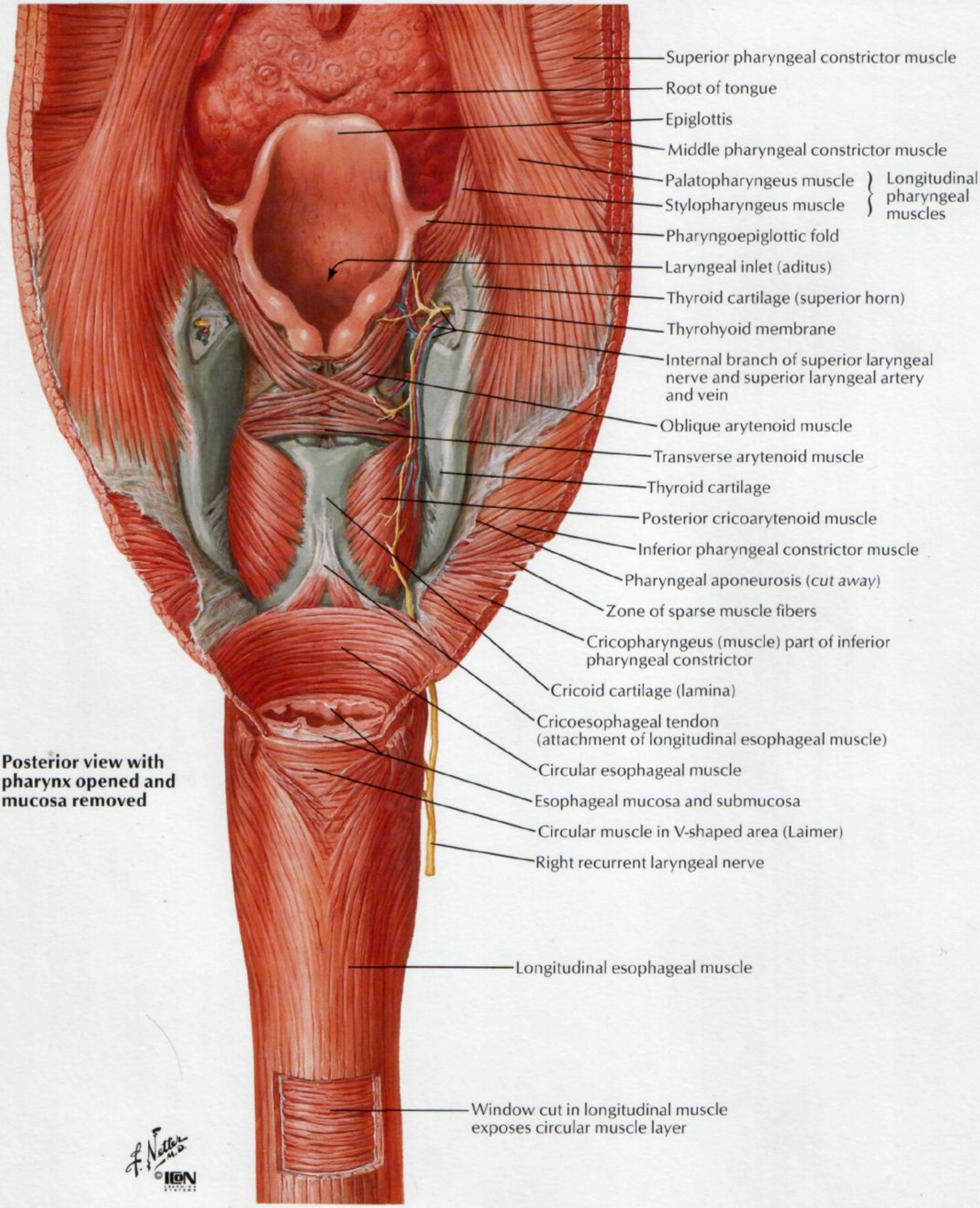
Musculature of Esophagus


Inferior pharyngeal constrictor muscle
Pharyngeal raphe
Thyroid cartilage
Zone of sparse muscle fibers
Cricopharyngeus (muscle) part of inferior pharyngeal constrictor
Main longitudinal muscle bundle passing upward and ventrally to attach to middle of posterior surface of cricoid cartilage
Cricoid cartilage
Accessory muscle bundle from postero-lateral surface of cricoid cartilage
Additional fibers from contralateral side of cricopharyngeus (muscle) part of inferior pharyngeal constrictor
Trachea
Circular muscle layer with sparse longitudinal fibers in V-shaped area (Laimer)
Hook
Bare area on ventral surface of esophagus
Lateral mass of longitudinal muscle
Fibroelastic membranes with sparse muscle fibers
Window cut in longitudinal muscle layer
Circular muscle layer
Left main bronchus

Pharyngoesophageal Junction

SEE ALSO PLATE 63



Superior pharyngeal constrictor muscle
Root of tongue
Epiglottis
Middle pharyngeal constrictor muscle
Palatopharyngeus muscle
Stylopharyngeus muscle
Longitudinal pharyngeal muscles
Pharyngoepiglottic fold
Laryngeal inlet (aditus)
Thyroid cartilage (superior horn)
Thyrohyoid membrane
Internal branch of superior laryngeal nerve and superior laryngeal artery and vein
Oblique arytenoid muscle
Transverse arytenoid muscle
Thyroid cartilage
Posterior cricoarytenoid muscle
Inferior pharyngeal constrictor muscle
Pharyngeal aponeurosis (cut away)
Zone of sparse muscle fibers
Cricopharyngeus (muscle) part of inferior pharyngeal constrictor
Cricoid cartilage (lamina)
Cricoesophageal tendon (attachment of longitudinal esophageal muscle)
Circular esophageal muscle
Esophageal mucosa and submucosa
Circular muscle in V-shaped area (Laimer)
Right recurrent laryngeal nerve
Longitudinal esophageal muscle
Window cut in longitudinal muscle exposes circular muscle layer
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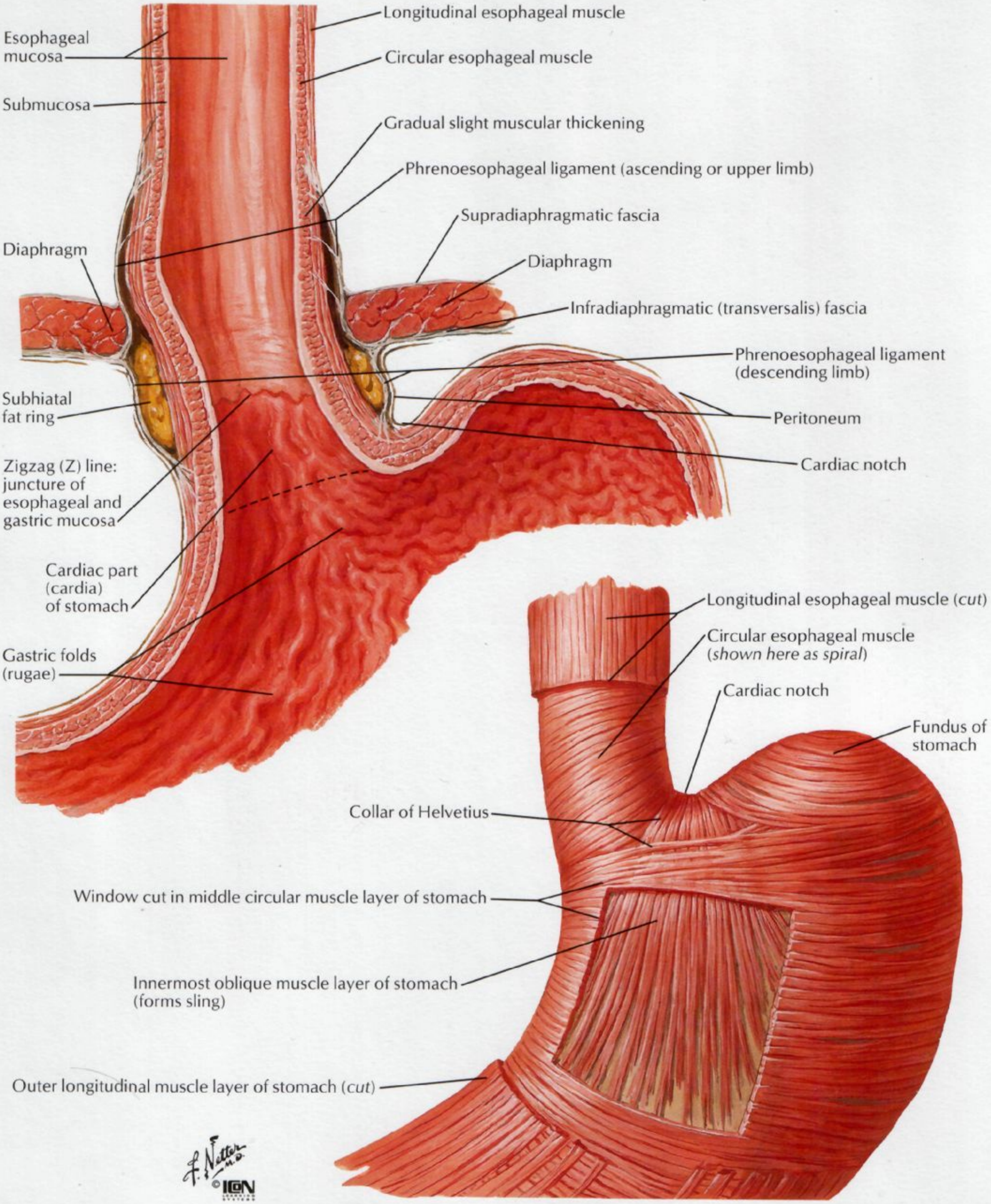
Posterior view with pharynx opened and mucosa removed

Esophagogastric Junction


Longitudinal esophageal muscle
Esophageal mucosa
Circular esophageal muscle
Submucosa
Gradual slight muscular thickening
Phrenoesophageal ligament (ascending or upper limb)
Supradiaphragmatic fascia
Diaphragm
Diaphragm
Infradiaphragmatic (transversalis) fascia
Phrenoesophageal ligament (descending limb)
Subhiatal fat ring
Peritoneum
Cardiac notch
Zigzag (Z) line: juncture of esophageal and gastric mucosa
Cardiac part (cardia) of stomach
Longitudinal esophageal muscle (*cut*)
Circular esophageal muscle (*shown here as spiral*)
Gastric folds (rugae)
Cardiac notch
Fundus of stomach
Collar of Helvetius
Window cut in middle circular muscle layer of stomach
Innermost oblique muscle layer of stomach (forms sling)
Outer longitudinal muscle layer of stomach (*cut*)
F. Netter M.D.
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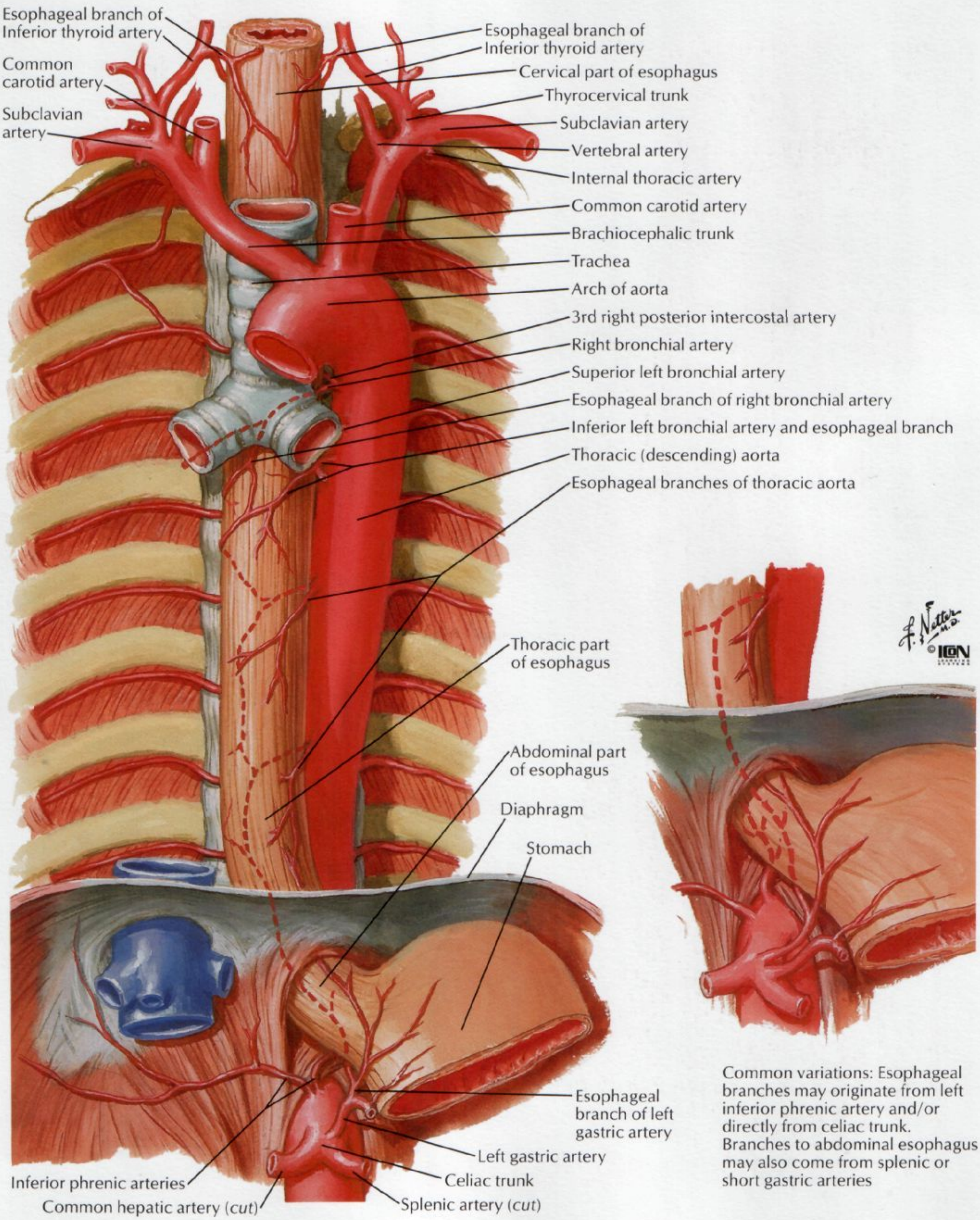
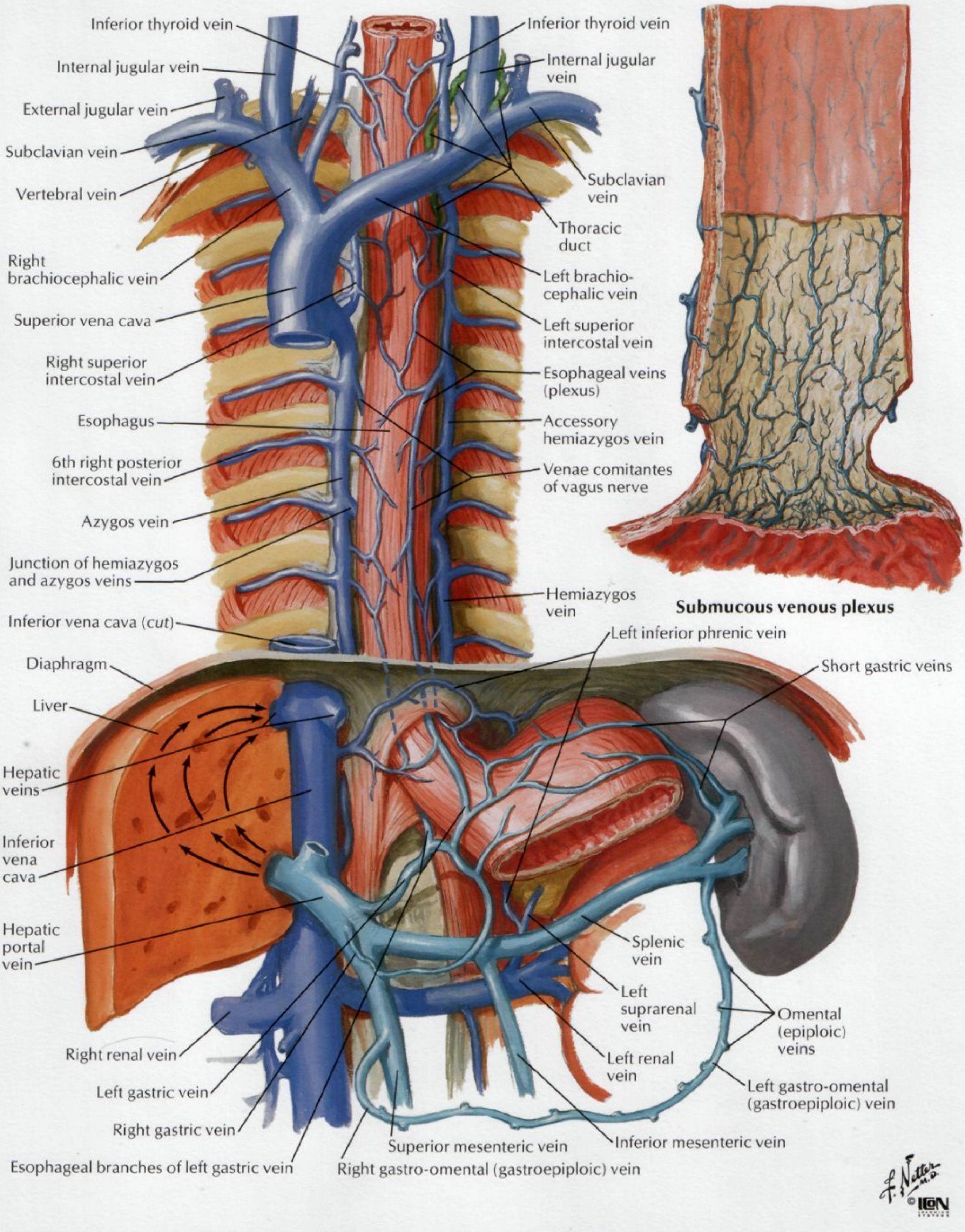
Arteries of Esophagus

SEE ALSO PLATES 290, 291


Esophageal branch of Inferior thyroid artery
Common carotid artery
Subclavian artery
Esophageal branch of Inferior thyroid artery
Cervical part of esophagus
Thyrocervical trunk
Subclavian artery
Vertebral artery
Internal thoracic artery
Common carotid artery
Brachiocephalic trunk
Trachea
Arch of aorta
3rd right posterior intercostal artery
Right bronchial artery
Superior left bronchial artery
Esophageal branch of right bronchial artery
Inferior left bronchial artery and esophageal branch
Thoracic (descending) aorta
Esophageal branches of thoracic aorta
Thoracic part of esophagus
Abdominal part of esophagus
Diaphragm
Stomach
Esophageal branch of left gastric artery
Left gastric artery
Celiac trunk
Splenic artery (*cut*)
Common hepatic artery (*cut*)
Inferior phrenic arteries

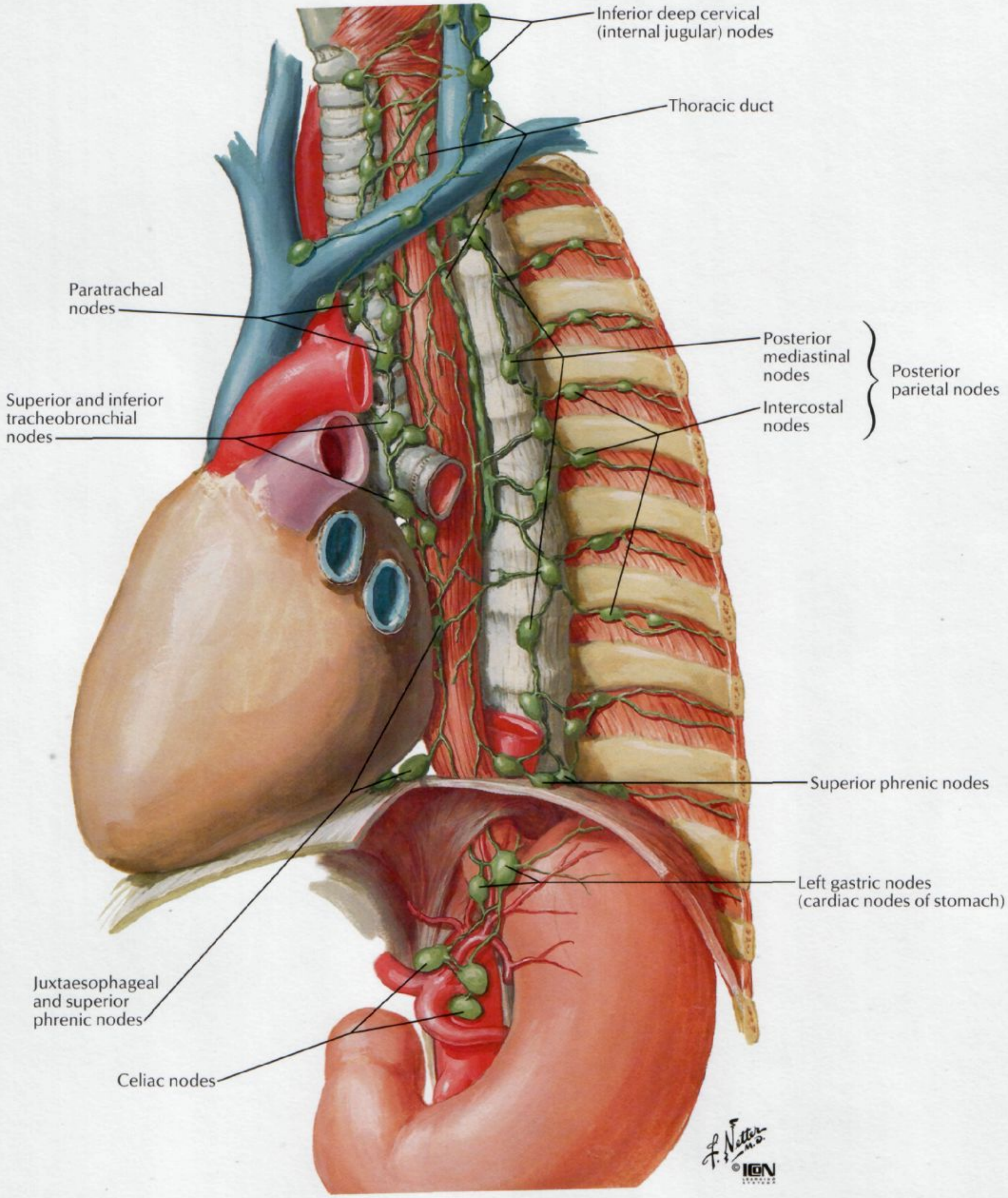
Common variations: Esophageal branches may originate from left inferior phrenic artery and/or directly from celiac trunk. Branches to abdominal esophagus may also come from splenic or short gastric arteries

SEE ALSO PLATE 302



Lymph Vessels and Nodes of Esophagus

SEE ALSO PLATES 204, 258


Inferior deep cervical (internal jugular) nodes
Thoracic duct
Paratracheal nodes
Posterior mediastinal nodes
Intercostal nodes
Posterior parietal nodes
Superior and inferior tracheobronchial nodes
Superior phrenic nodes
Left gastric nodes (cardiac nodes of stomach)
Juxtaesophageal and superior phrenic nodes
Celiac nodes
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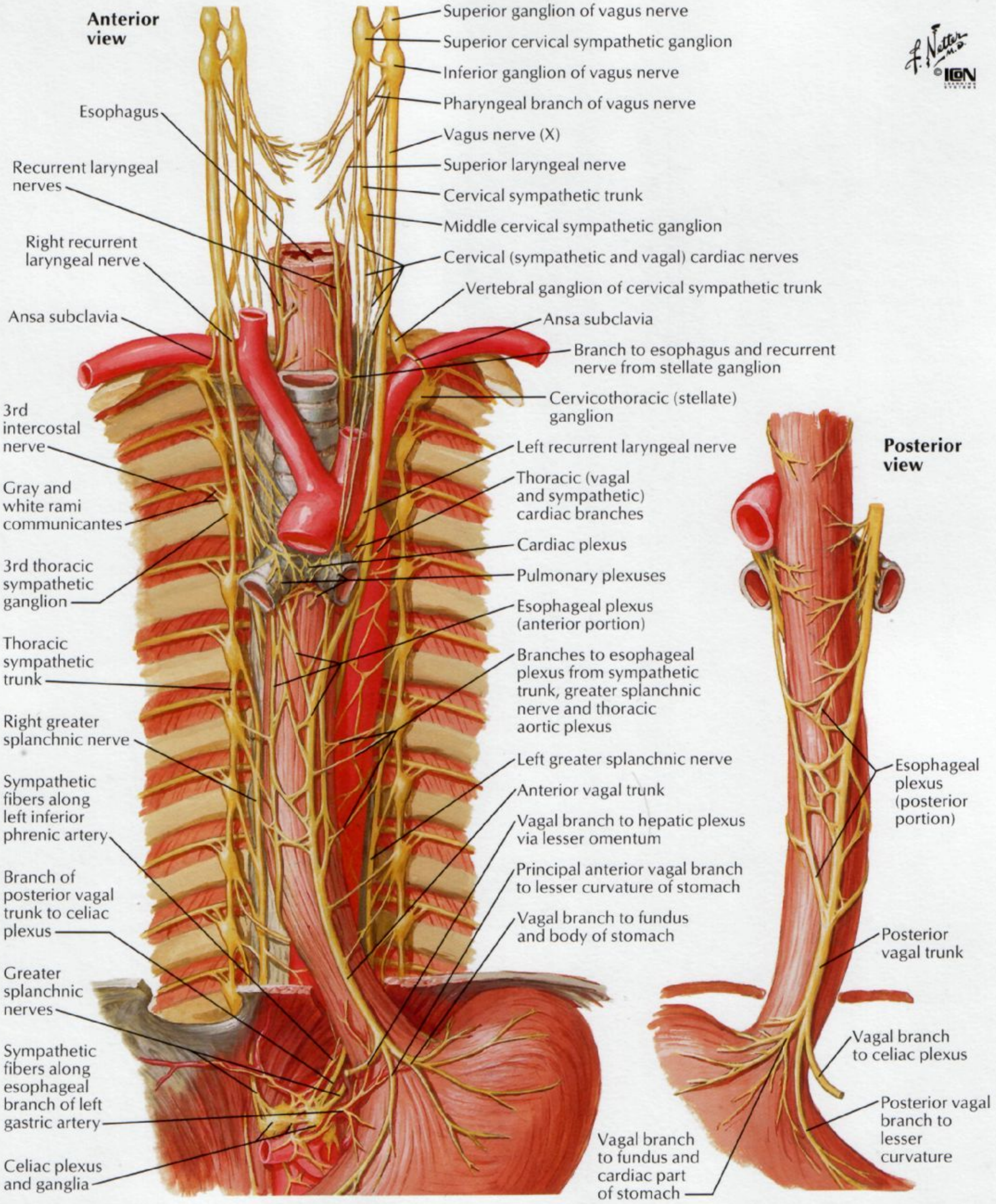
Nerves of Esophagus

SEE ALSO PLATES 159, 205


Anterior view
Esophagus
Recurrent laryngeal nerves
Right recurrent laryngeal nerve
Ansa subclavia
3rd intercostal nerve
Gray and white rami communicantes
3rd thoracic sympathetic ganglion
Thoracic sympathetic trunk
Right greater splanchnic nerve
Sympathetic fibers along left inferior phrenic artery
Branch of posterior vagal trunk to celiac plexus
Greater splanchnic nerves
Sympathetic fibers along esophageal branch of left gastric artery
Celiac plexus and ganglia
Superior ganglion of vagus nerve
Superior cervical sympathetic ganglion
Inferior ganglion of vagus nerve
Pharyngeal branch of vagus nerve
Vagus nerve (X)
Superior laryngeal nerve
Cervical sympathetic trunk
Middle cervical sympathetic ganglion
Cervical (sympathetic and vagal) cardiac nerves
Vertebral ganglion of cervical sympathetic trunk
Ansa subclavia
Branch to esophagus and recurrent nerve from stellate ganglion
Cervicothoracic (stellate) ganglion
Left recurrent laryngeal nerve
Thoracic (vagal and sympathetic) cardiac branches
Cardiac plexus
Pulmonary plexuses
Esophageal plexus (anterior portion)
Branches to esophageal plexus from sympathetic trunk, greater splanchnic nerve and thoracic aortic plexus
Left greater splanchnic nerve
Anterior vagal trunk
Vagal branch to hepatic plexus via lesser omentum
Principal anterior vagal branch to lesser curvature of stomach
Vagal branch to fundus and body of stomach
Vagal branch to fundus and cardiac part of stomach
Posterior view
Esophageal plexus (posterior portion)
Posterior vagal trunk
Vagal branch to celiac plexus
Posterior vagal branch to lesser curvature
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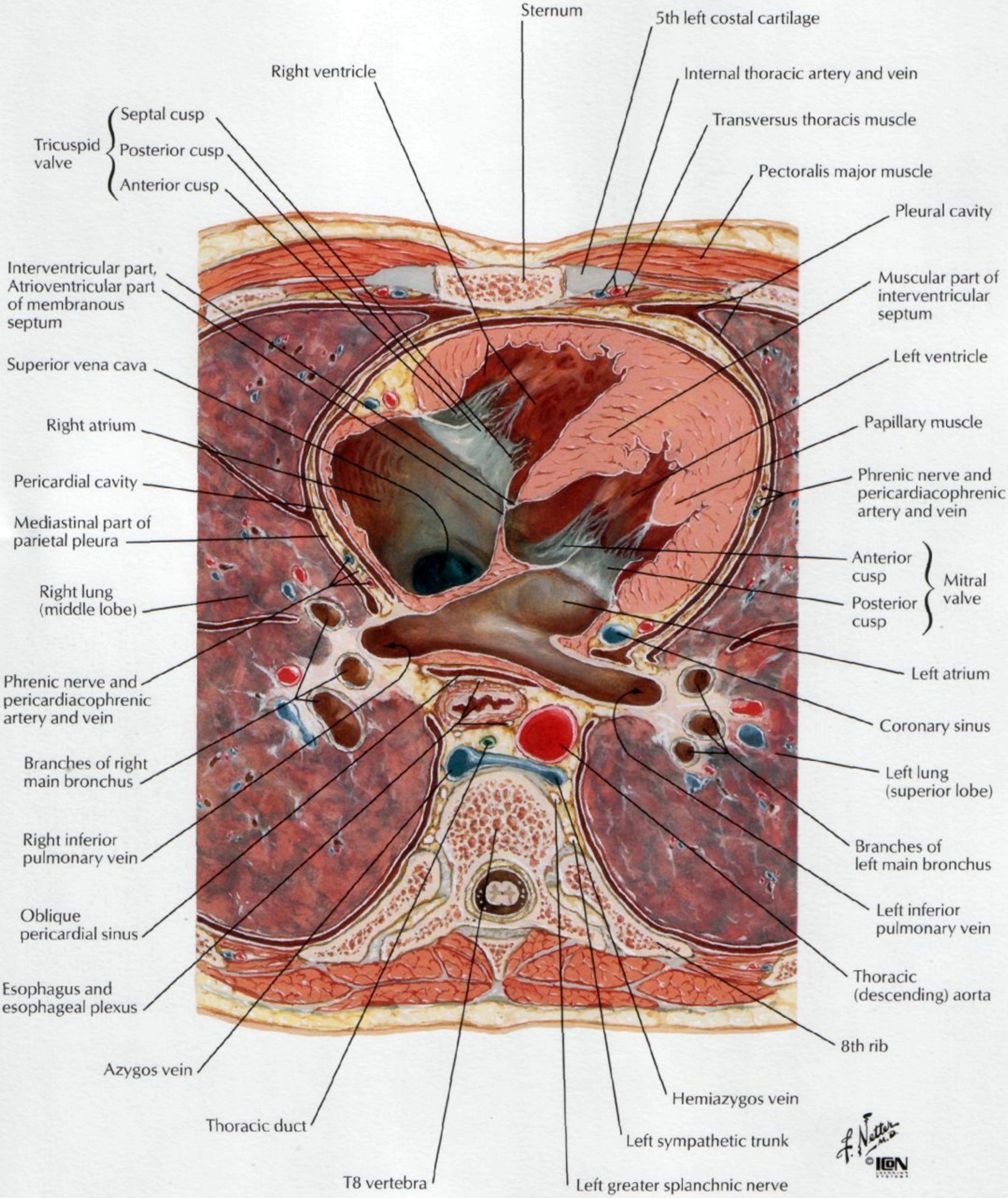
Mediastinum: Cross Section

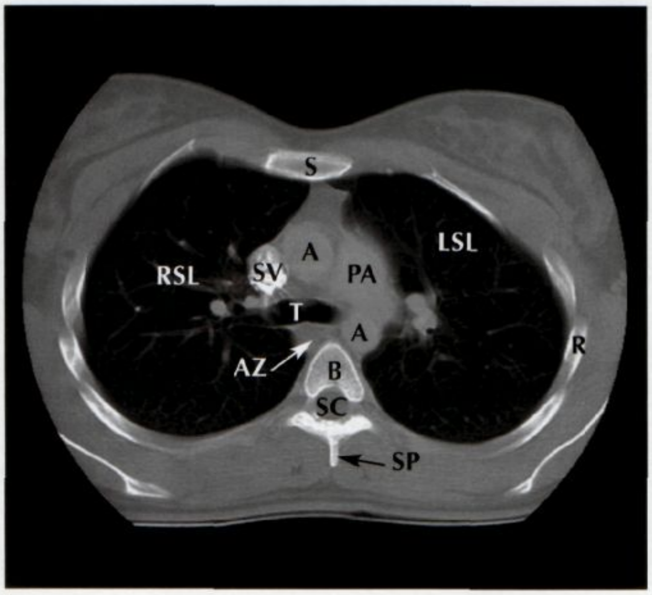
SEE ALSO PLATE 533


Sternum
5th left costal cartilage
Right ventricle
Internal thoracic artery and vein
Transversus thoracis muscle
Tricuspid valve
Septal cusp
Posterior cusp
Anterior cusp
Pectoralis major muscle
Pleural cavity
Interventricular part, Atrioventricular part of membranous septum
Muscular part of interventricular septum
Left ventricle
Superior vena cava
Right atrium
Papillary muscle
Pericardial cavity
Phrenic nerve and pericardiacophrenic artery and vein
Mediastinal part of parietal pleura
Anterior cusp
Posterior cusp
Mitral valve
Right lung (middle lobe)
Left atrium
Phrenic nerve and pericardiacophrenic artery and vein
Coronary sinus
Branches of right main bronchus
Left lung (superior lobe)
Right inferior pulmonary vein
Branches of left main bronchus
Oblique pericardial sinus
Left inferior pulmonary vein
Thoracic (descending) aorta
Esophagus and esophageal plexus
8th rib
Azygos vein
Hemiazygos vein
Thoracic duct
Left sympathetic trunk
T8 vertebra
Left greater splanchnic nerve

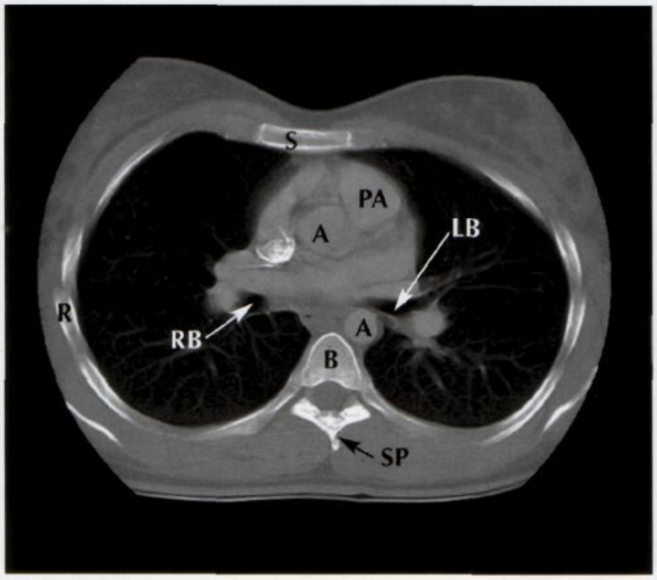
Chest Scans: Axial CT Images

Series of chest axial CT images from superior (A) to inferior (C)

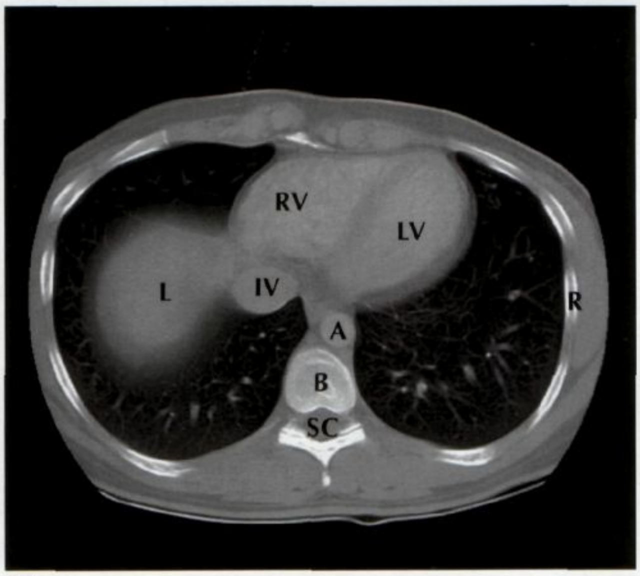
A



A	Aorta
AZ	Azygos vein
B	Body of vertebra
IV	Inferior vena cava
L	Liver
LB	Left bronchus
LSL	Left superior lobe of lung
LV	Left ventricle
PA	Pulmonary artery
R	Rib
RB	Right bronchus
RSL	Right superior lobe of lung
RV	Right ventricle
S	Sternum
SC	Spinal cord
SP	Spinous process of vertebra
SV	Superior vena cava
T	Trachea (bifurcation)



B



C

Section IV
ABDOMEN

SURFACE ANATOMY
Plate 239

239. Abdomen

BODY WALL
Plates 240–259

240. Bony Framework of Abdomen
241. Anterior Abdominal Wall: Superficial Dissection
242. Anterior Abdominal Wall: Intermediate Dissection
243. Anterior Abdominal Wall: Deep Dissection
244. Rectus Sheath: Cross Sections
245. Anterior Abdominal Wall: Internal View
246. Posterolateral Abdominal Wall
247. Arteries of Anterior Abdominal Wall
248. Veins of Anterior Abdominal Wall
249. Nerves of Anterior Abdominal Wall
250. Thoracoabdominal Nerves
251. Inguinal Region: Dissections
252. Femoral Sheath and Inguinal Canal
253. Inguinal Canal and Spermatic Cord
254. Indirect Inguinal Hernia
255. Posterior Abdominal Wall: Internal View
256. Arteries of Posterior Abdominal Wall
257. Veins of Posterior Abdominal Wall
258. Lymph Vessels and Nodes of Posterior Abdominal Wall
259. Nerves of Posterior Abdominal Wall

PERITONEAL CAVITY
Plates 260–266

260. Regions and Planes of Abdomen
261. Greater Omentum and Abdominal Viscera

262. Mesenteric Relations of Intestines
263. Mesenteric Relations of Intestines (*continued*)
264. Omental Bursa: Stomach Reflected
265. Omental Bursa: Cross Section
266. Peritoneum of Posterior Abdominal Wall

VISCERA (GUT)
Plates 267–277

267. Stomach In Situ
268. Mucosa of Stomach
269. Musculature of Stomach
270. Duodenum In Situ
271. Mucosa and Musculature of Duodenum
272. Mucosa and Musculature of Small Intestine
273. Ileocecal Region
274. Ileocecal Region (*continued*)
275. (Vermiform) Appendix
276. Mucosa and Musculature of Large Intestine
277. Sigmoid Colon: Variations in Position

VISCERA (ACCESSORY ORGANS)
Plates 278–289

278. Topography of Liver
279. Surfaces and Bed of Liver
280. Liver In Situ and Variations in Form
281. Liver Segments and Lobes: Vessel and Duct Distribution
282. Intrahepatic Vascular and Duct Systems
283. Liver Structure: Schema
284. Intrahepatic Biliary System: Schema
285. Gallbladder and Extrahepatic Bile Ducts
286. Variations in Cystic and Hepatic Ducts
287. Junction of (Common) Bile Duct and Duodenum
288. Pancreas In Situ
289. Spleen

VISCERAL VASCULATURE
Plates 290–307

290. Arteries of Stomach, Liver and Spleen
291. Arteries of Stomach, Duodenum, Pancreas and Spleen
292. Arteries of Liver, Pancreas, Duodenum and Spleen
293. Celiac Arteriogram
294. Arteries of Duodenum and Head of Pancreas
295. Arteries of Small Intestine
296. Arteries of Large Intestine
297. Arterial Variations and Collateral Supply of Liver and Gallbladder
298. Variations in Colic Arteries
299. Veins of Stomach, Duodenum, Pancreas and Spleen
300. Veins of Small Intestine
301. Veins of Large Intestine
302. Hepatic Portal Vein Tributaries: Portocaval Anastomoses
303. Variations of Hepatic Portal Vein
304. Lymph Vessels and Nodes of Stomach
305. Lymph Vessels and Nodes of Small Intestine

306. Lymph Vessels and Nodes of Large Intestine
307. Lymph Vessels and Nodes of Pancreas

INNERVATION
Plates 308–318

308. Autonomic Nerves and Ganglia of Abdomen
309. Nerves of Stomach and Duodenum
310. Nerves of Stomach and Duodenum (*continued*)
311. Innervation of Stomach and Duodenum: Schema
312. Nerves of Small Intestine
313. Nerves of Large Intestine
314. Innervation of Small and Large Intestines: Schema
315. Autonomic Reflex Pathways: Schema
316. Intrinsic Autonomic Plexuses of Intestine: Schema
317. Innervation of Liver and Biliary Tract: Schema
318. Innervation of Pancreas: Schema

KIDNEYS AND SUPRARENAL GLANDS
Plates 319–334

319. Kidneys In Situ: Anterior Views
320. Kidneys In Situ: Posterior Views
321. Gross Structure of Kidney
322. Renal Artery and Vein In Situ
323. Intrarenal Arteries and Renal Segments
324. Variations in Renal Artery and Vein
325. Nephron and Collecting Tubule: Schema
326. Blood Vessels in Parenchyma of Kidney: Schema
327. Ureters
328. Arteries of Ureters and Urinary Bladder
329. Lymph Vessels and Nodes of Kidneys and Urinary Bladder
330. Nerves of Kidneys, Ureters and Urinary Bladder
331. Innervation of Kidneys and Upper Ureters: Schema
332. Renal Fascia
333. Arteries and Veins of Suprarenal Glands In Situ
334. Nerves of Suprarenal Glands: Dissection and Schema

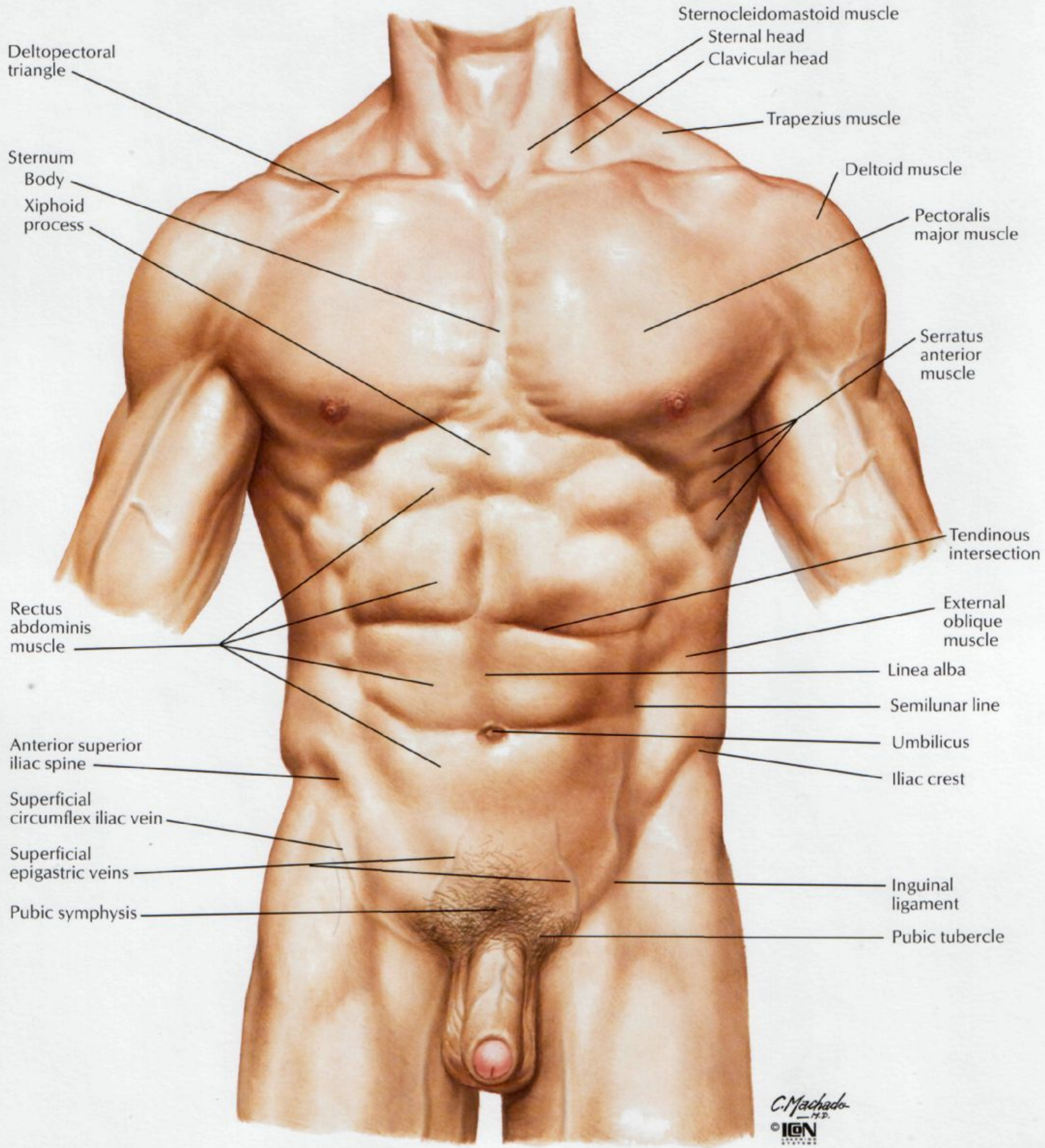
ABDOMINAL SECTIONS
Plates 335–337

335. Abdominal Wall and Viscera: Median (Sagittal) Section
336. Schematic Cross Section of Abdomen at T12
337. Schematic Cross Section of Abdomen at L3, 4

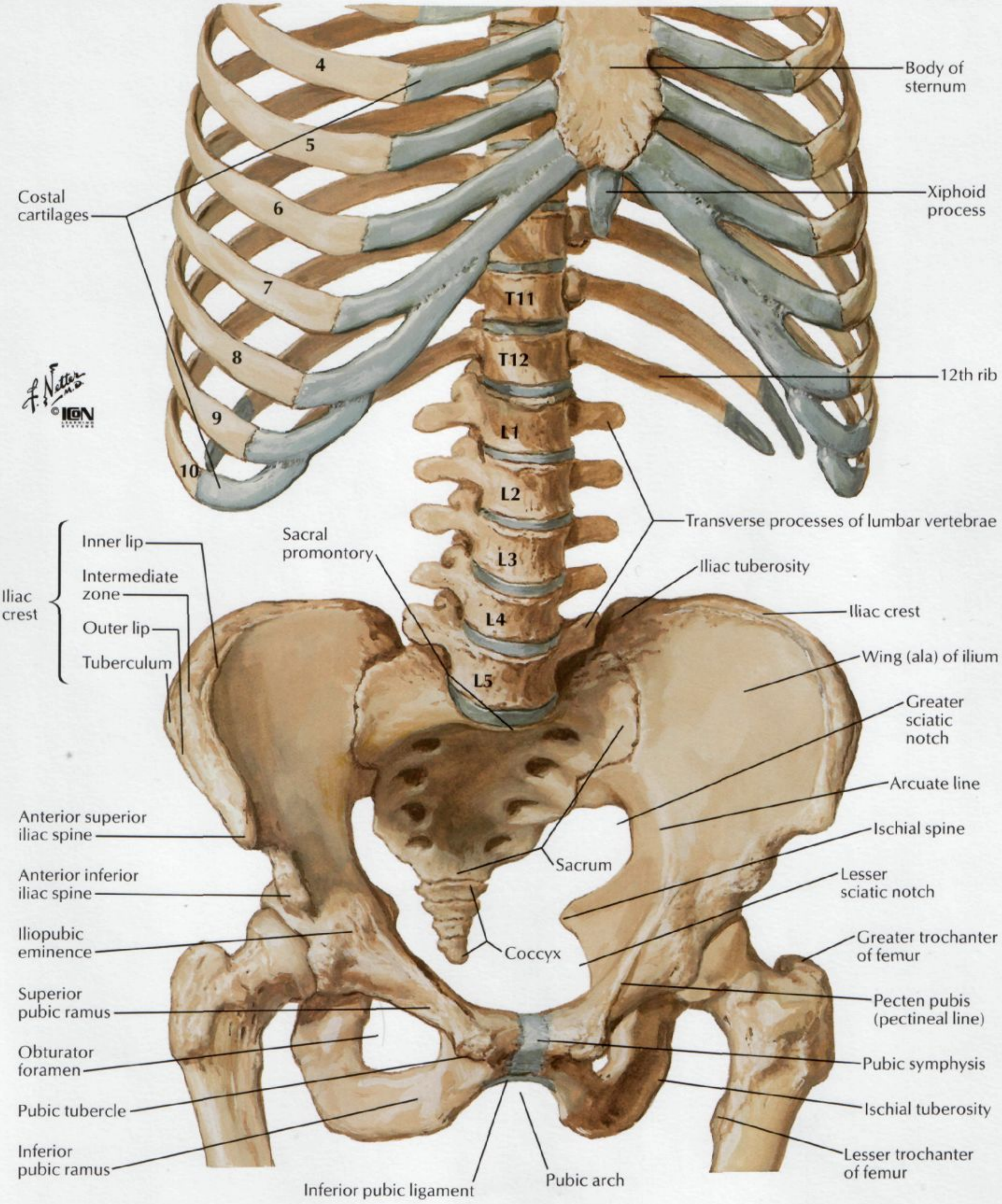
REGIONAL SCANS
Plate 338

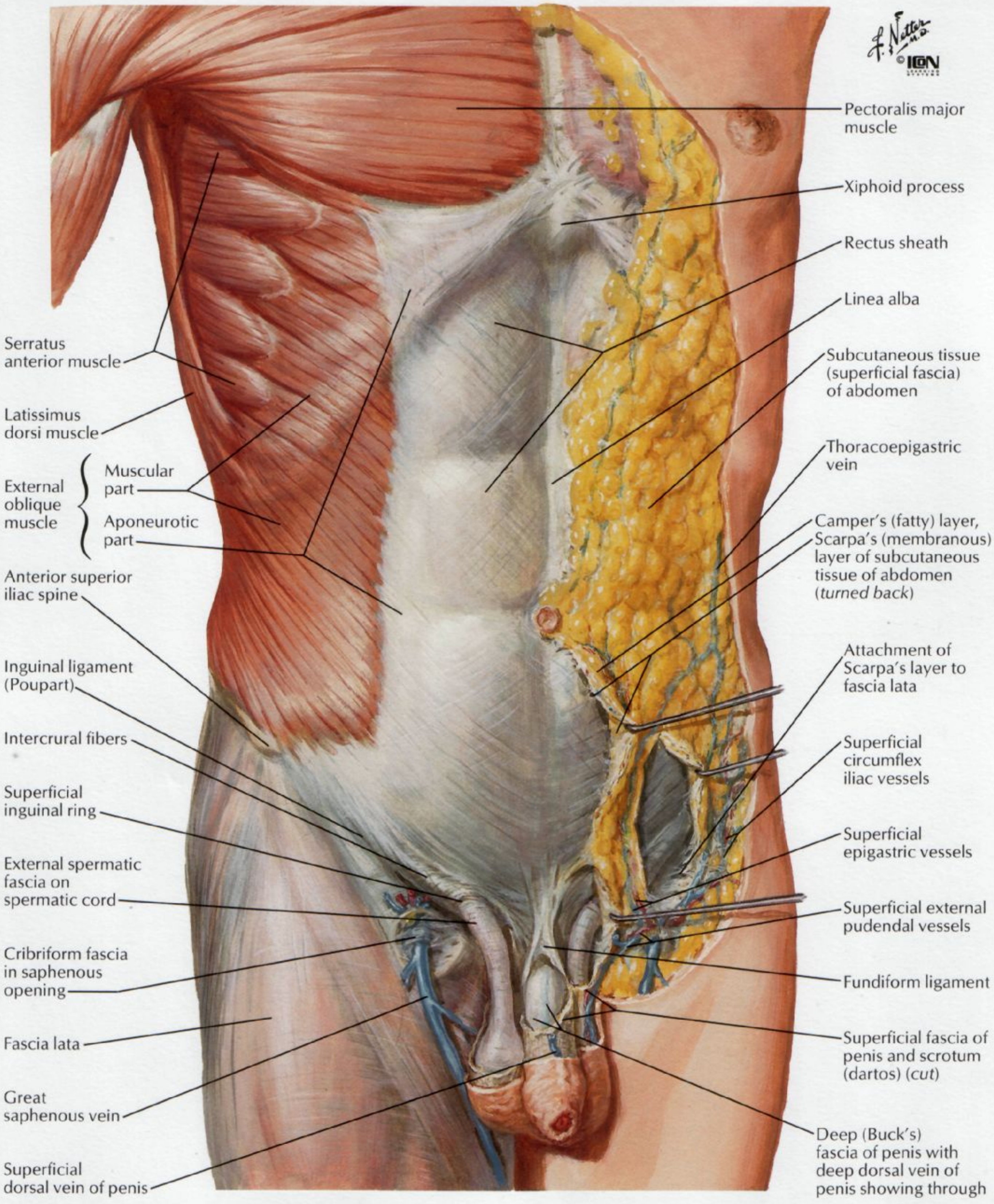
338. Abdominal Scans: Axial CT Images

FOR REGIONS SEE PLATE 260

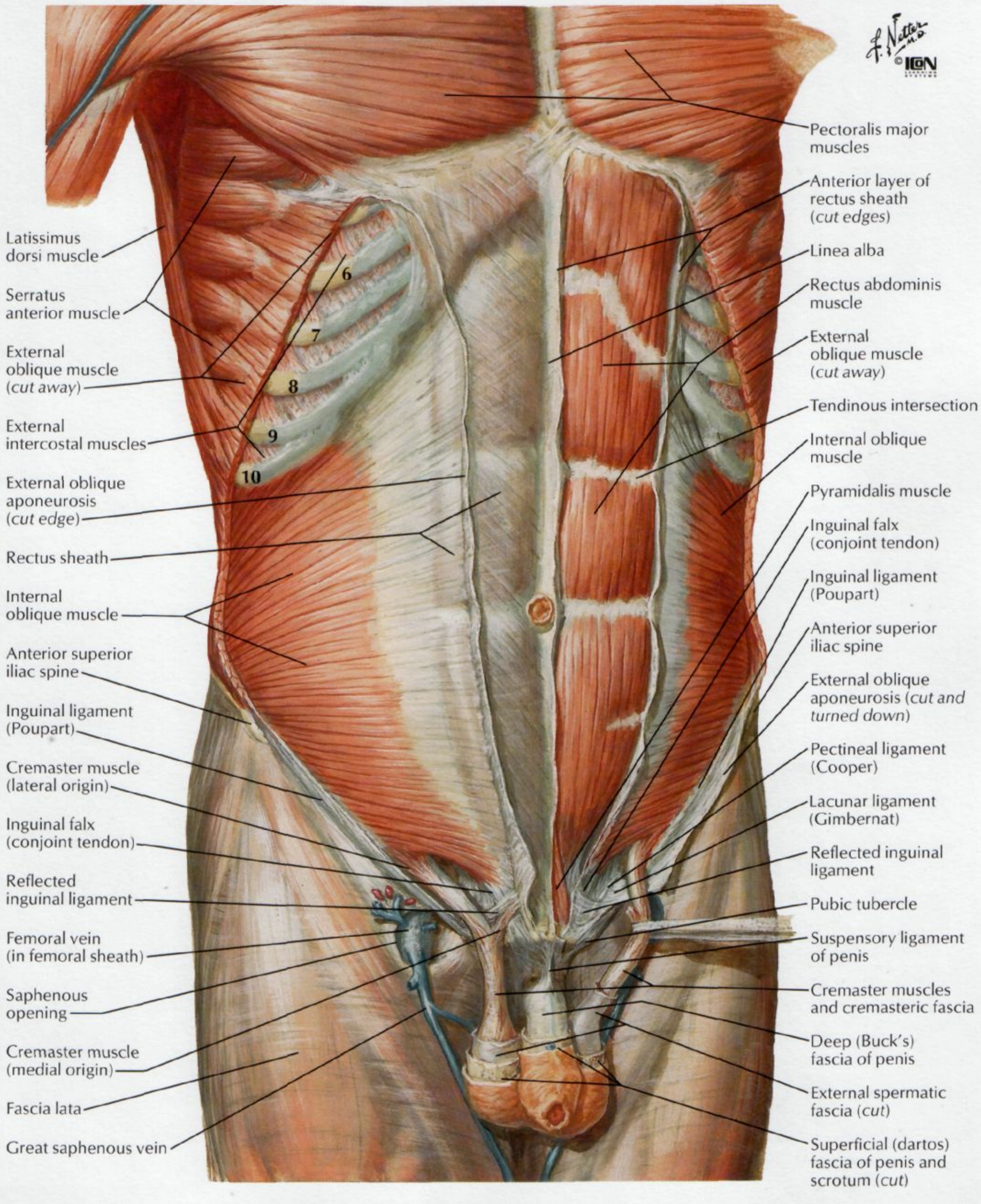


Bony Framework of Abdomen




F. Netter M.D.
© ICON LEARNING SYSTEMS
Pectoralis major muscle
Xiphoid process
Rectus sheath
Linea alba
Subcutaneous tissue (superficial fascia) of abdomen
Thoracoepigastric vein
Camper's (fatty) layer, Scarpa's (membranous) layer of subcutaneous tissue of abdomen (*turned back*)
Attachment of Scarpa's layer to fascia lata
Superficial circumflex iliac vessels
Superficial epigastric vessels
Superficial external pudendal vessels
Fundiform ligament
Superficial fascia of penis and scrotum (dartos) (*cut*)
Deep (Buck's) fascia of penis with deep dorsal vein of penis showing through
Serratus anterior muscle
Latissimus dorsi muscle
External oblique muscle
Muscular part
Aponeurotic part
Anterior superior iliac spine
Inguinal ligament (Poupart)
Intercrural fibers
Superficial inguinal ring
External spermatic fascia on spermatic cord
Cribriform fascia in saphenous opening
Fascia lata
Great saphenous vein
Superficial dorsal vein of penis

Anterior Abdominal Wall: Intermediate Dissection


Latissimus dorsi muscle
Serratus anterior muscle
External oblique muscle (*cut away*)
External intercostal muscles
External oblique aponeurosis (*cut edge*)
Rectus sheath
Internal oblique muscle
Anterior superior iliac spine
Inguinal ligament (Poupart)
Cremaster muscle (lateral origin)
Inguinal falx (conjoint tendon)
Reflected inguinal ligament
Femoral vein (in femoral sheath)
Saphenous opening
Cremaster muscle (medial origin)
Fascia lata
Great saphenous vein
6
7
8
9
10
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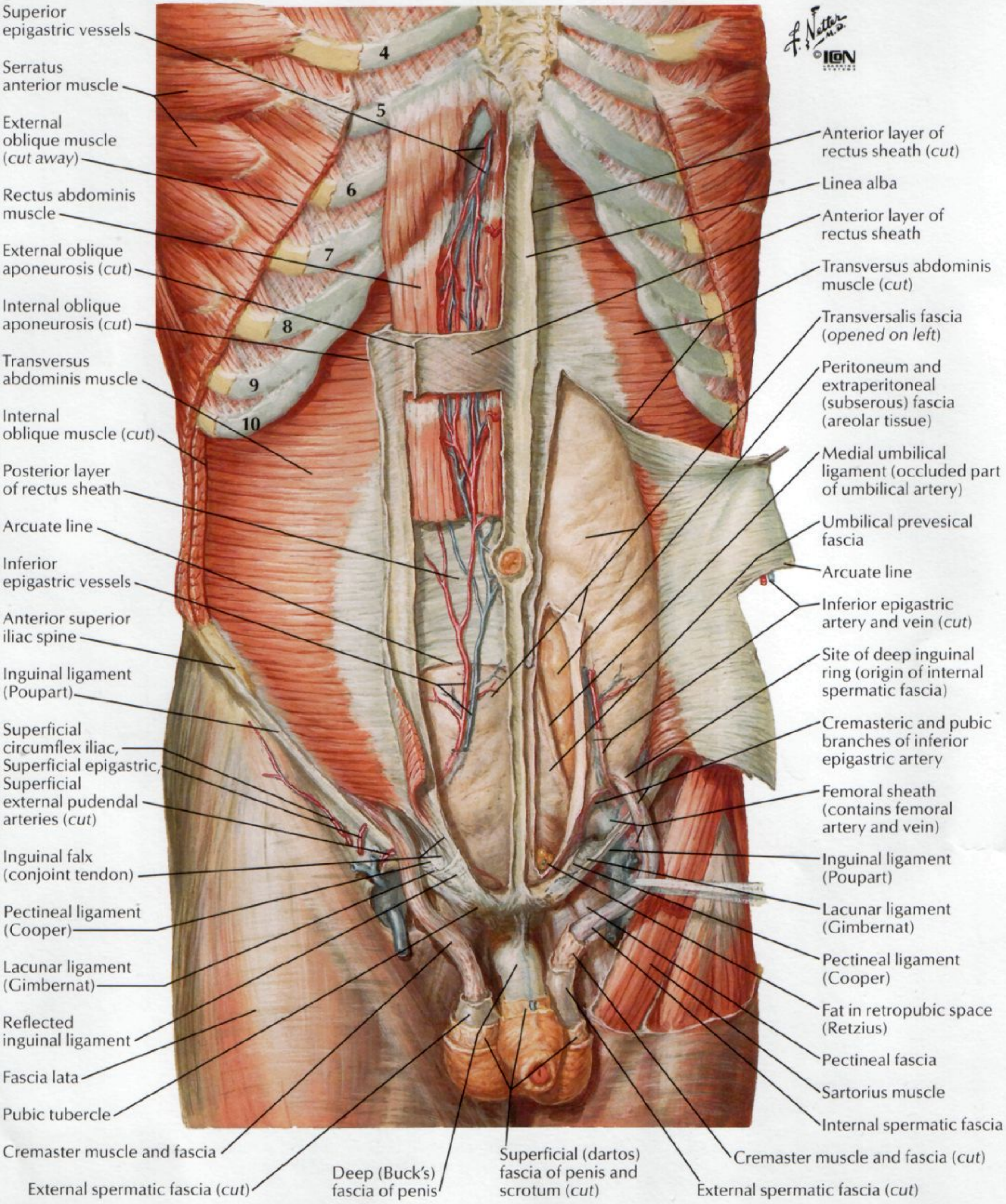
Pectoralis major muscles
Anterior layer of rectus sheath (*cut edges*)
Linea alba
Rectus abdominis muscle
External oblique muscle (*cut away*)
Tendinous intersection
Internal oblique muscle
Pyramidalis muscle
Inguinal falx (conjoint tendon)
Inguinal ligament (Poupart)
Anterior superior iliac spine
External oblique aponeurosis (*cut and turned down*)
Pectineal ligament (Cooper)
Lacunar ligament (Gimbernat)
Reflected inguinal ligament
Pubic tubercle
Suspensory ligament of penis
Cremaster muscles and cremasteric fascia
Deep (Buck's) fascia of penis
External spermatic fascia (*cut*)
Superficial (dartos) fascia of penis and scrotum (*cut*)

Anterior Abdominal Wall: Deep Dissection


Superior epigastric vessels
Serratus anterior muscle
External oblique muscle (*cut away*)
Rectus abdominis muscle
External oblique aponeurosis (*cut*)
Internal oblique aponeurosis (*cut*)
Transversus abdominis muscle
Internal oblique muscle (*cut*)
Posterior layer of rectus sheath
Arcuate line
Inferior epigastric vessels
Anterior superior iliac spine
Inguinal ligament (Poupart)
Superficial circumflex iliac, Superficial epigastric, Superficial external pudendal arteries (*cut*)
Inguinal falx (conjoint tendon)
Pectineal ligament (Cooper)
Lacunar ligament (Gimbernat)
Reflected inguinal ligament
Fascia lata
Pubic tubercle
Cremaster muscle and fascia
External spermatic fascia (*cut*)
Deep (Buck's) fascia of penis
Superficial (dartos) fascia of penis and scrotum (*cut*)
External spermatic fascia (*cut*)
Cremaster muscle and fascia (*cut*)
Internal spermatic fascia
Sartorius muscle
Pectineal fascia
Fat in retropubic space (Retzius)
Pectineal ligament (Cooper)
Lacunar ligament (Gimbernat)
Inguinal ligament (Poupart)
Femoral sheath (contains femoral artery and vein)
Cremasteric and pubic branches of inferior epigastric artery
Site of deep inguinal ring (origin of internal spermatic fascia)
Inferior epigastric artery and vein (*cut*)
Arcuate line
Umbilical prevesical fascia
Medial umbilical ligament (occluded part of umbilical artery)
Peritoneum and extraperitoneal (subserous) fascia (areolar tissue)
Transversalis fascia (*opened on left*)
Transversus abdominis muscle (*cut*)
Anterior layer of rectus sheath
Linea alba
Anterior layer of rectus sheath (*cut*)
4
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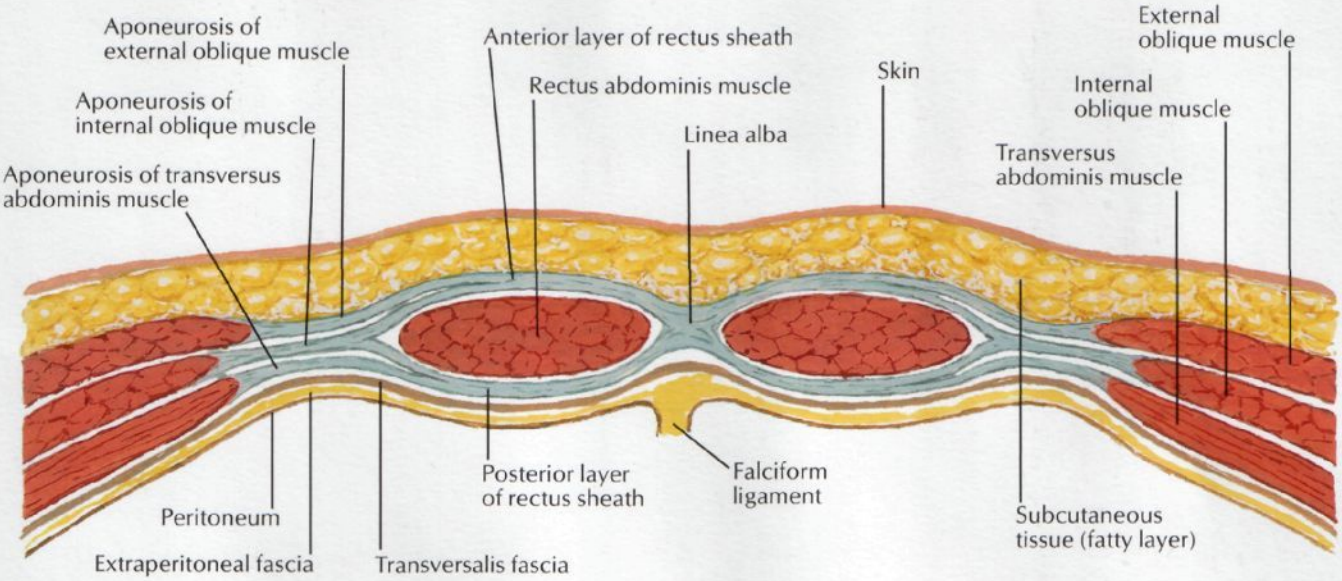
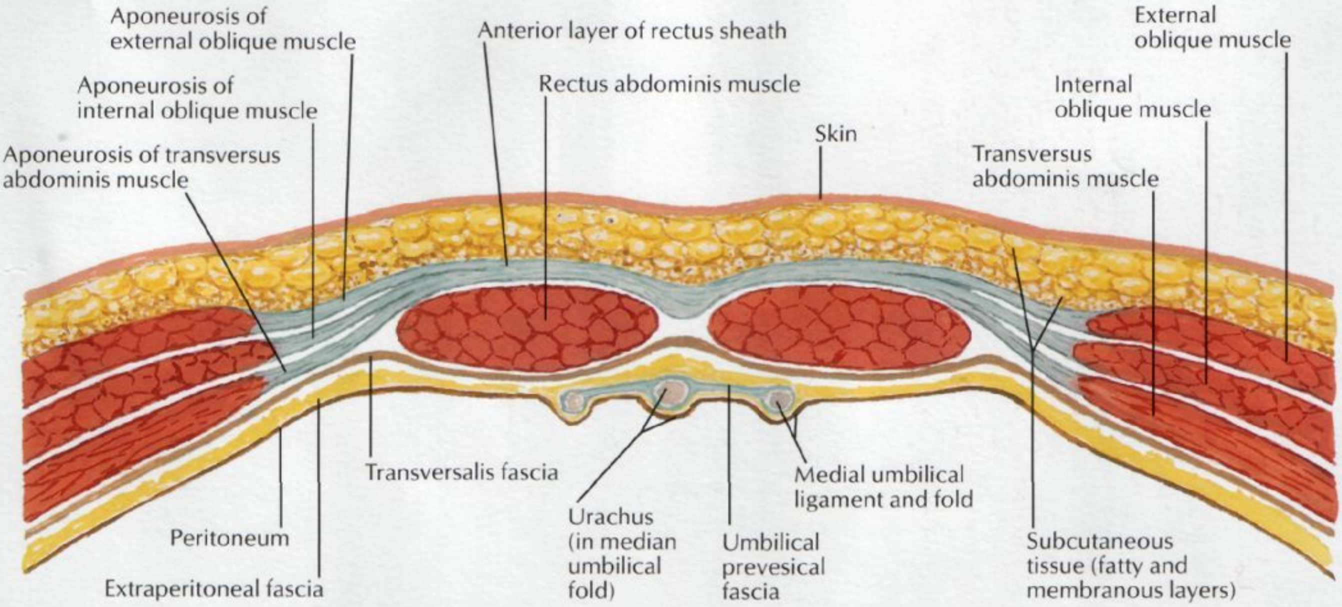
Rectus Sheath: Cross Sections

Section above arcuate line


Aponeurosis of external oblique muscle
Aponeurosis of internal oblique muscle
Aponeurosis of transversus abdominis muscle
Anterior layer of rectus sheath
Rectus abdominis muscle
Linea alba
Skin
External oblique muscle
Internal oblique muscle
Transversus abdominis muscle
Posterior layer of rectus sheath
Falciform ligament
Subcutaneous tissue (fatty layer)
Peritoneum
Extraperitoneal fascia
Transversalis fascia

Aponeurosis of internal oblique muscle splits to form anterior and posterior layers of rectus sheath. Aponeurosis of external oblique muscle joins anterior layer of sheath; aponeurosis of transversus abdominis muscle joins posterior layer. Anterior and posterior layers of rectus sheath unite medially to form linea alba

Section below arcuate line


Aponeurosis of external oblique muscle
Aponeurosis of internal oblique muscle
Aponeurosis of transversus abdominis muscle
Anterior layer of rectus sheath
Rectus abdominis muscle
Skin
External oblique muscle
Internal oblique muscle
Transversus abdominis muscle
Transversalis fascia
Medial umbilical ligament and fold
Urachus (in median umbilical fold)
Umbilical prevesical fascia
Subcutaneous tissue (fatty and membranous layers)
Peritoneum
Extraperitoneal fascia

Aponeurosis of internal oblique muscle does not split at this level but passes completely anterior to rectus abdominis muscle and is fused there with both aponeurosis of external oblique muscle and that of transversus abdominis muscle. Thus, posterior wall of rectus sheath is absent below arcuate line and rectus abdominis muscle lies on transversalis fascia

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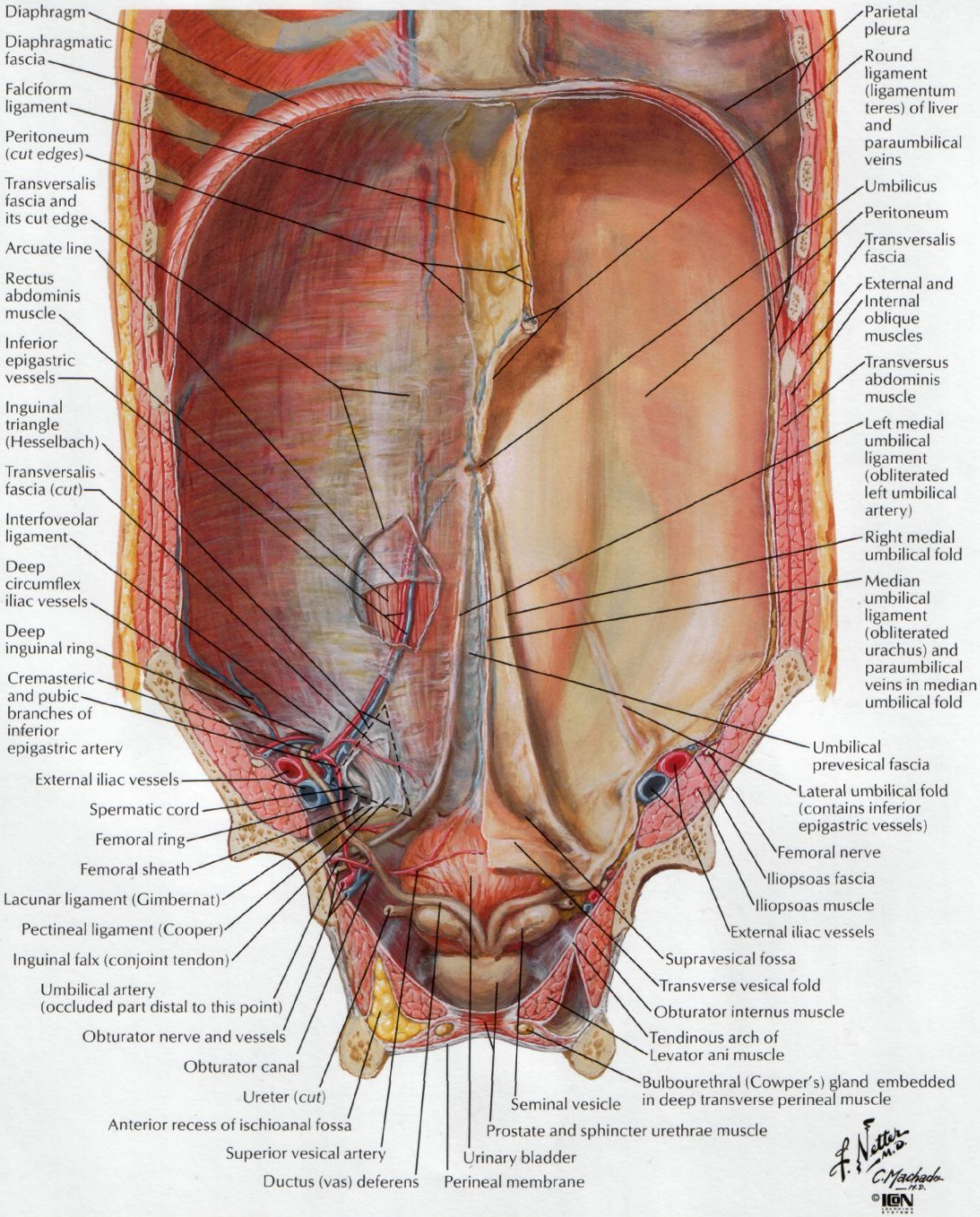
Anterior Abdominal Wall: Internal View

FOR UMBILICAL VESSELS SEE PLATE 225


Diaphragm
Diaphragmatic fascia
Falciform ligament
Peritoneum (*cut edges*)
Transversalis fascia and its cut edge
Arcuate line
Rectus abdominis muscle
Inferior epigastric vessels
Inguinal triangle (Hesselbach)
Transversalis fascia (*cut*)
Interfoveolar ligament
Deep circumflex iliac vessels
Deep inguinal ring
Cremasteric and pubic branches of inferior epigastric artery
External iliac vessels
Spermatic cord
Femoral ring
Femoral sheath
Lacunar ligament (Gimbernat)
Pectineal ligament (Cooper)
Inguinal falx (conjoint tendon)
Umbilical artery (occluded part distal to this point)
Obturator nerve and vessels
Obturator canal
Ureter (*cut*)
Anterior recess of ischioanal fossa
Superior vesical artery
Ductus (vas) deferens
Perineal membrane
Urinary bladder
Prostate and sphincter urethrae muscle
Seminal vesicle
Bulbourethral (Cowper's) gland embedded in deep transverse perineal muscle
Tendinous arch of Levator ani muscle
Obturator internus muscle
Transverse vesical fold
Supravesical fossa
External iliac vessels
Iliopsoas muscle
Iliopsoas fascia
Femoral nerve
Lateral umbilical fold (contains inferior epigastric vessels)
Umbilical prevesical fascia
Median umbilical ligament (obliterated urachus) and paraumbilical veins in median umbilical fold
Right medial umbilical fold
Left medial umbilical ligament (obliterated left umbilical artery)
Transversus abdominis muscle
External and Internal oblique muscles
Transversalis fascia
Peritoneum
Umbilicus
Round ligament (ligamentum teres) of liver and paraumbilical veins
Parietal pleura
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C. Machado M.D.
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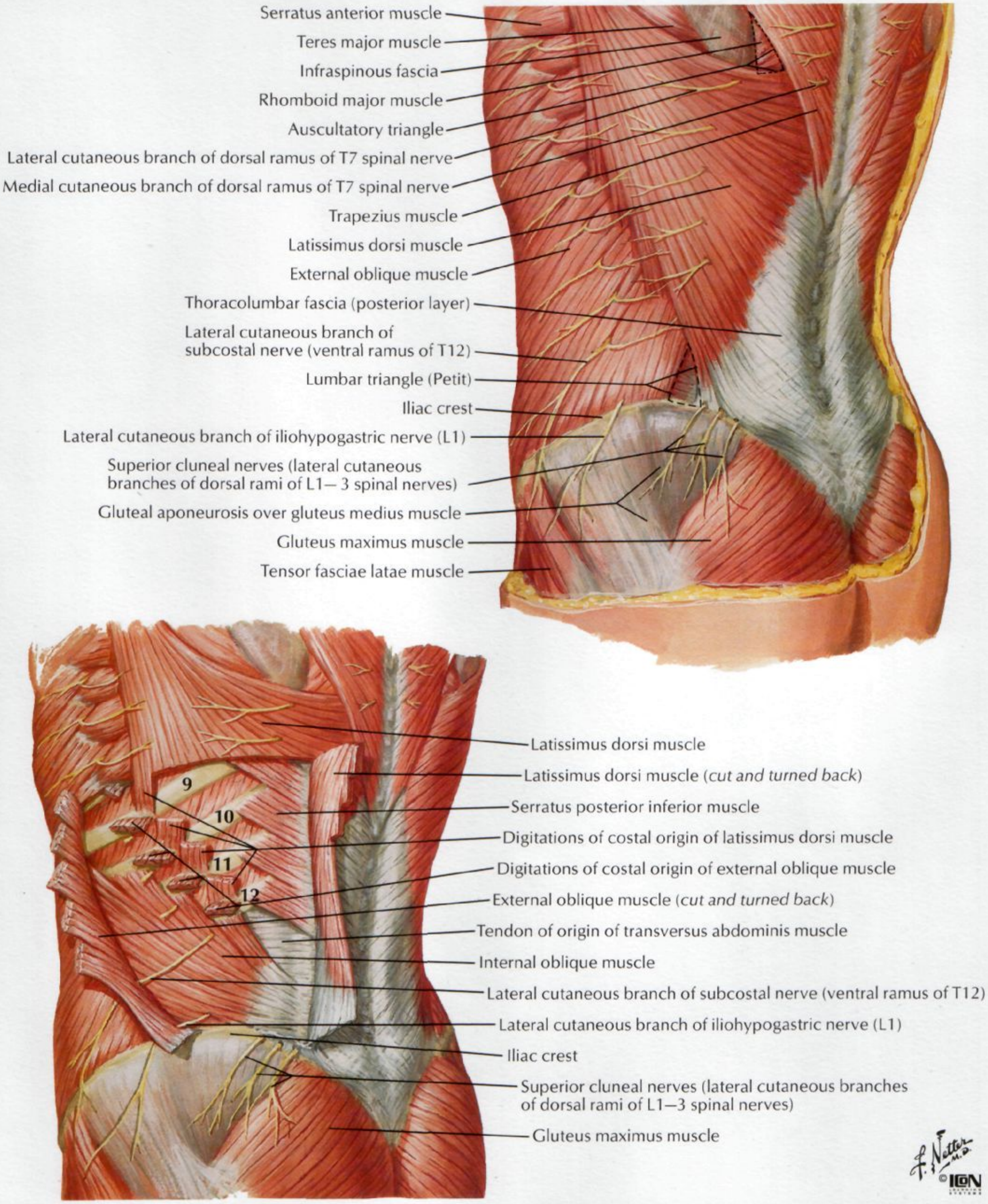
Posterolateral Abdominal Wall

SEE ALSO PLATES 167, 170, 172, 173, 250


Serratus anterior muscle
Teres major muscle
Infraspinous fascia
Rhomboid major muscle
Auscultatory triangle
Lateral cutaneous branch of dorsal ramus of T7 spinal nerve
Medial cutaneous branch of dorsal ramus of T7 spinal nerve
Trapezius muscle
Latissimus dorsi muscle
External oblique muscle
Thoracolumbar fascia (posterior layer)
Lateral cutaneous branch of subcostal nerve (ventral ramus of T12)
Lumbar triangle (Petit)
Iliac crest
Lateral cutaneous branch of iliohypogastric nerve (L1)
Superior cluneal nerves (lateral cutaneous branches of dorsal rami of L1–3 spinal nerves)
Gluteal aponeurosis over gluteus medius muscle
Gluteus maximus muscle
Tensor fasciae latae muscle
9
10
11
12
Latissimus dorsi muscle
Latissimus dorsi muscle (*cut and turned back*)
Serratus posterior inferior muscle
Digitations of costal origin of latissimus dorsi muscle
Digitations of costal origin of external oblique muscle
External oblique muscle (*cut and turned back*)
Tendon of origin of transversus abdominis muscle
Internal oblique muscle
Lateral cutaneous branch of subcostal nerve (ventral ramus of T12)
Lateral cutaneous branch of iliohypogastric nerve (L1)
Iliac crest
Superior cluneal nerves (lateral cutaneous branches of dorsal rami of L1–3 spinal nerves)
Gluteus maximus muscle
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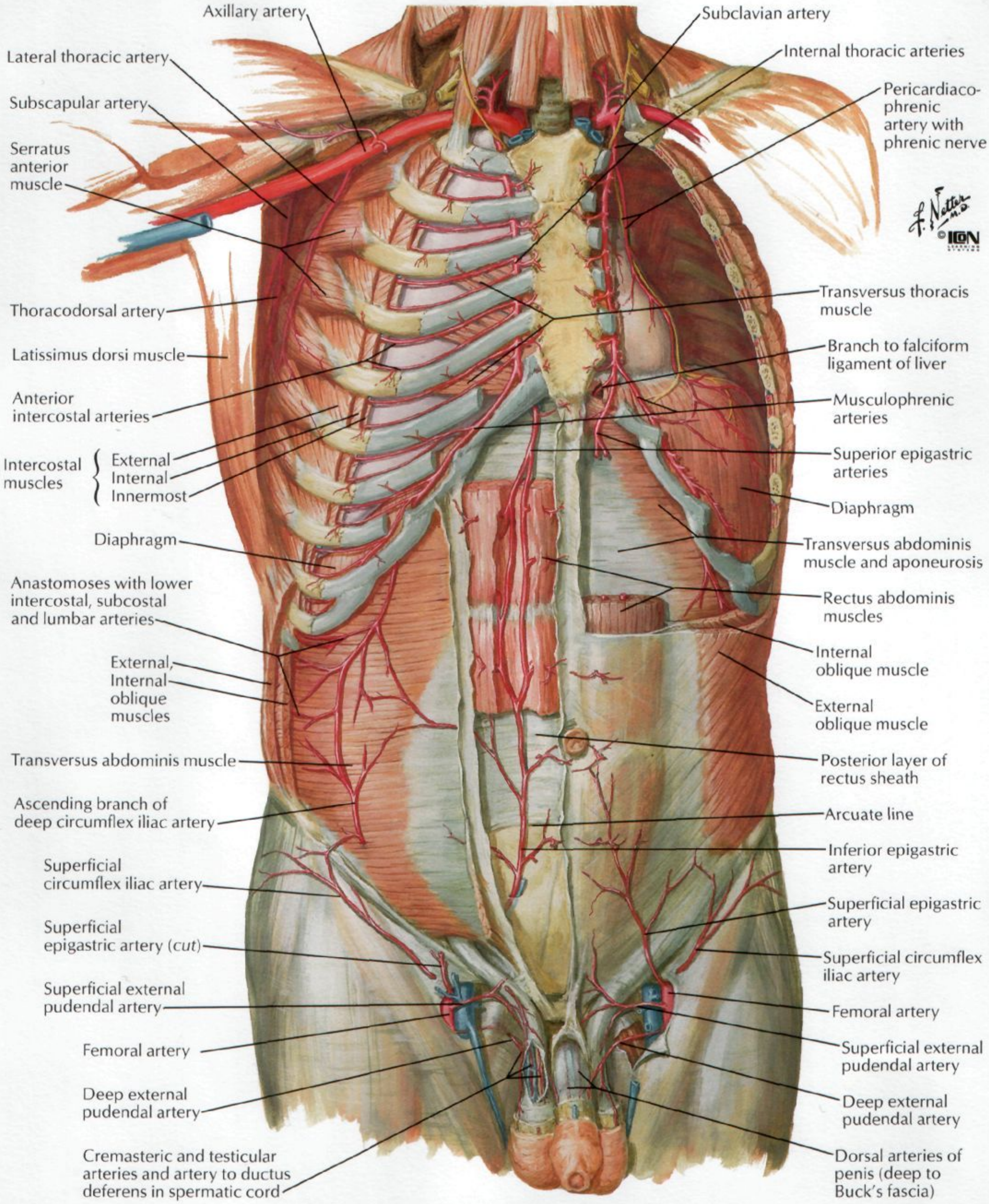
Arteries of Anterior Abdominal Wall


Axillary artery
Lateral thoracic artery
Subscapular artery
Serratus anterior muscle
Thoracodorsal artery
Latissimus dorsi muscle
Anterior intercostal arteries
Intercostal muscles
External
Internal
Innermost
Diaphragm
Anastomoses with lower intercostal, subcostal and lumbar arteries
External, Internal oblique muscles
Transversus abdominis muscle
Ascending branch of deep circumflex iliac artery
Superficial circumflex iliac artery
Superficial epigastric artery (*cut*)
Superficial external pudendal artery
Femoral artery
Deep external pudendal artery
Cremasteric and testicular arteries and artery to ductus deferens in spermatic cord
Subclavian artery
Internal thoracic arteries
Pericardiacophrenic artery with phrenic nerve
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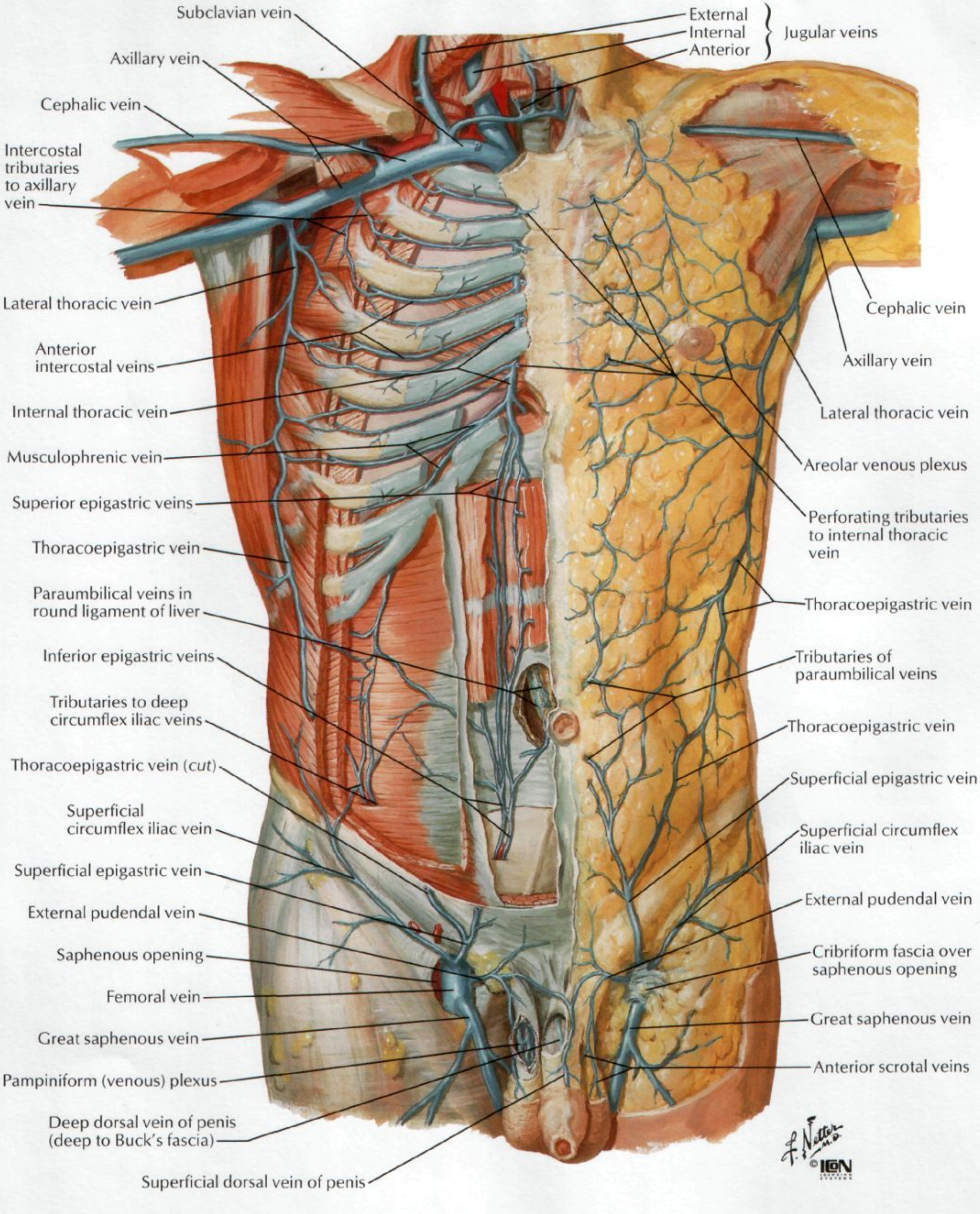
Transversus thoracis muscle
Branch to falciform ligament of liver
Musculophrenic arteries
Superior epigastric arteries
Diaphragm
Transversus abdominis muscle and aponeurosis
Rectus abdominis muscles
Internal oblique muscle
External oblique muscle
Posterior layer of rectus sheath
Arcuate line
Inferior epigastric artery
Superficial epigastric artery
Superficial circumflex iliac artery
Femoral artery
Superficial external pudendal artery
Deep external pudendal artery
Dorsal arteries of penis (deep to Buck's fascia)

Veins of Anterior Abdominal Wall


Subclavian vein
Axillary vein
Cephalic vein
Intercostal tributaries to axillary vein
Lateral thoracic vein
Anterior intercostal veins
Internal thoracic vein
Musculophrenic vein
Superior epigastric veins
Thoracoepigastric vein
Paraumbilical veins in round ligament of liver
Inferior epigastric veins
Tributaries to deep circumflex iliac veins
Thoracoepigastric vein (*cut*)
Superficial circumflex iliac vein
Superficial epigastric vein
External pudendal vein
Saphenous opening
Femoral vein
Great saphenous vein
Pampiniform (venous) plexus
Deep dorsal vein of penis (deep to Buck's fascia)
Superficial dorsal vein of penis
External
Internal
Anterior
Jugular veins
Cephalic vein
Axillary vein
Lateral thoracic vein
Areolar venous plexus
Perforating tributaries to internal thoracic vein
Thoracoepigastric vein
Tributaries of paraumbilical veins
Thoracoepigastric vein
Superficial epigastric vein
Superficial circumflex iliac vein
External pudendal vein
Cribriform fascia over saphenous opening
Great saphenous vein
Anterior scrotal veins
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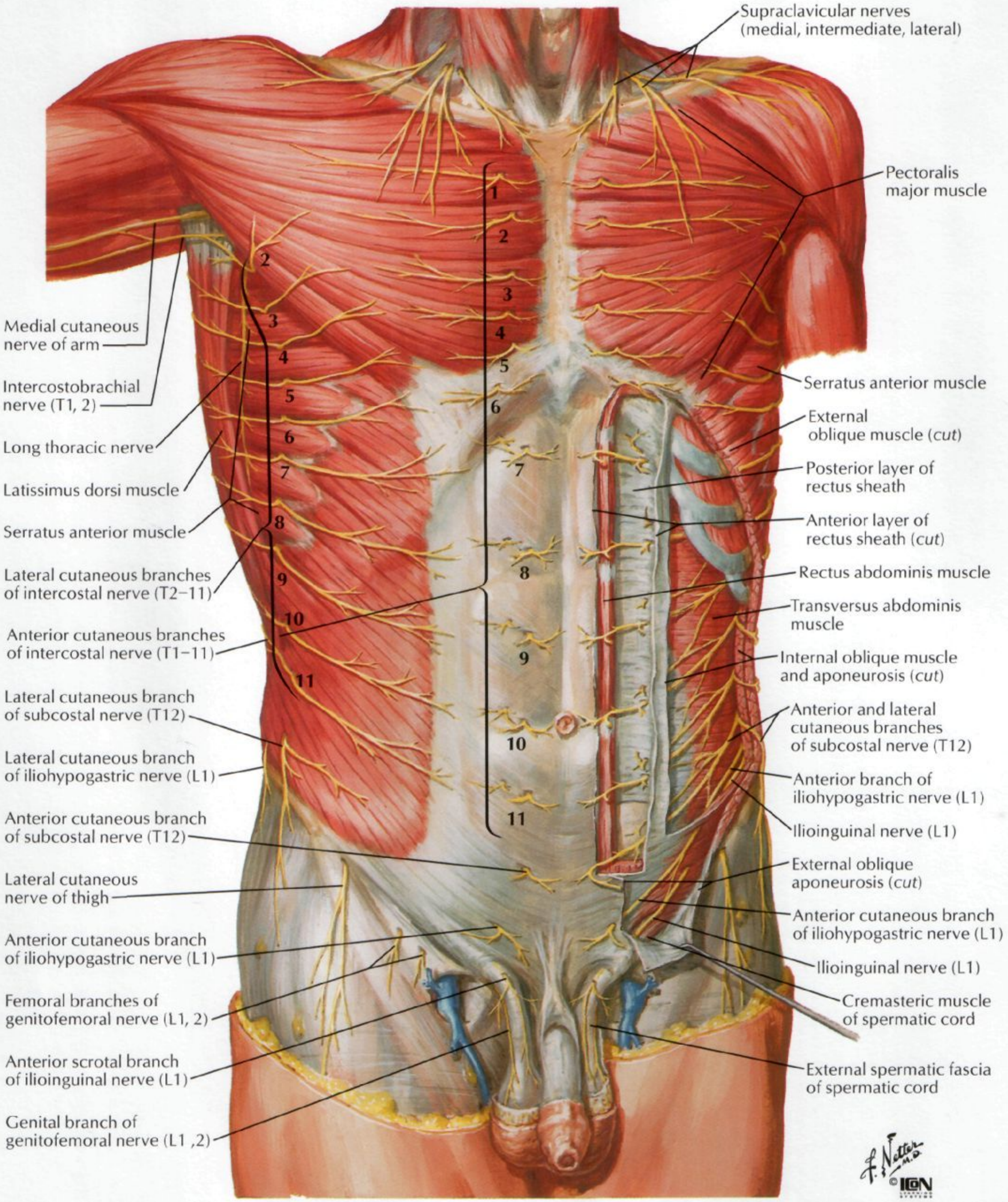
Nerves of Anterior Abdominal Wall

SEE ALSO PLATES 170, 246, 259, 480


Supraclavicular nerves (medial, intermediate, lateral)
Pectoralis major muscle
Serratus anterior muscle
External oblique muscle (*cut*)
Posterior layer of rectus sheath
Anterior layer of rectus sheath (*cut*)
Rectus abdominis muscle
Transversus abdominis muscle
Internal oblique muscle and aponeurosis (*cut*)
Anterior and lateral cutaneous branches of subcostal nerve (T12)
Anterior branch of iliohypogastric nerve (L1)
Ilioinguinal nerve (L1)
External oblique aponeurosis (*cut*)
Anterior cutaneous branch of iliohypogastric nerve (L1)
Ilioinguinal nerve (L1)
Cremasteric muscle of spermatic cord
External spermatic fascia of spermatic cord
Medial cutaneous nerve of arm
Intercostobrachial nerve (T1, 2)
Long thoracic nerve
Latissimus dorsi muscle
Serratus anterior muscle
Lateral cutaneous branches of intercostal nerve (T2–11)
Anterior cutaneous branches of intercostal nerve (T1–11)
Lateral cutaneous branch of subcostal nerve (T12)
Lateral cutaneous branch of iliohypogastric nerve (L1)
Anterior cutaneous branch of subcostal nerve (T12)
Lateral cutaneous nerve of thigh
Anterior cutaneous branch of iliohypogastric nerve (L1)
Femoral branches of genitofemoral nerve (L1, 2)
Anterior scrotal branch of ilioinguinal nerve (L1)
Genital branch of genitofemoral nerve (L1 ,2)
1
2
3
4
5
6
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8
9
10
11
2
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11
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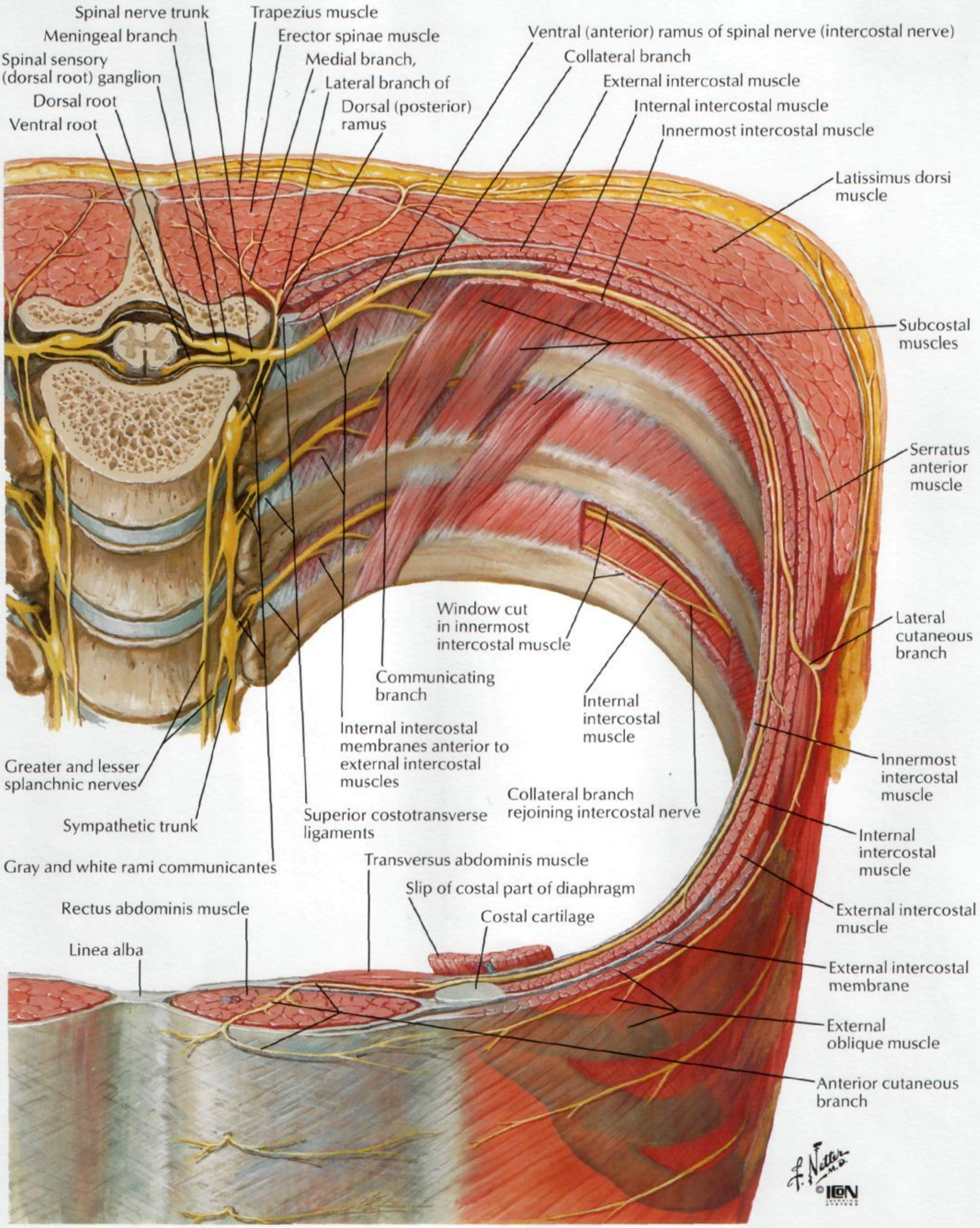
Thoracoabdominal Nerves

SEE ALSO PLATES 173, 187


Spinal nerve trunk
Trapezius muscle
Meningeal branch
Erector spinae muscle
Spinal sensory (dorsal root) ganglion
Medial branch,
Lateral branch of
Dorsal (posterior) ramus
Dorsal root
Ventral root
Ventral (anterior) ramus of spinal nerve (intercostal nerve)
Collateral branch
External intercostal muscle
Internal intercostal muscle
Innermost intercostal muscle
Latissimus dorsi muscle
Subcostal muscles
Serratus anterior muscle
Window cut in innermost intercostal muscle
Lateral cutaneous branch
Communicating branch
Internal intercostal muscle
Internal intercostal membranes anterior to external intercostal muscles
Innermost intercostal muscle
Greater and lesser splanchnic nerves
Collateral branch rejoining intercostal nerve
Sympathetic trunk
Superior costotransverse ligaments
Internal intercostal muscle
Gray and white rami communicantes
Transversus abdominis muscle
Slip of costal part of diaphragm
Rectus abdominis muscle
Costal cartilage
External intercostal muscle
Linea alba
External intercostal membrane
External oblique muscle
Anterior cutaneous branch
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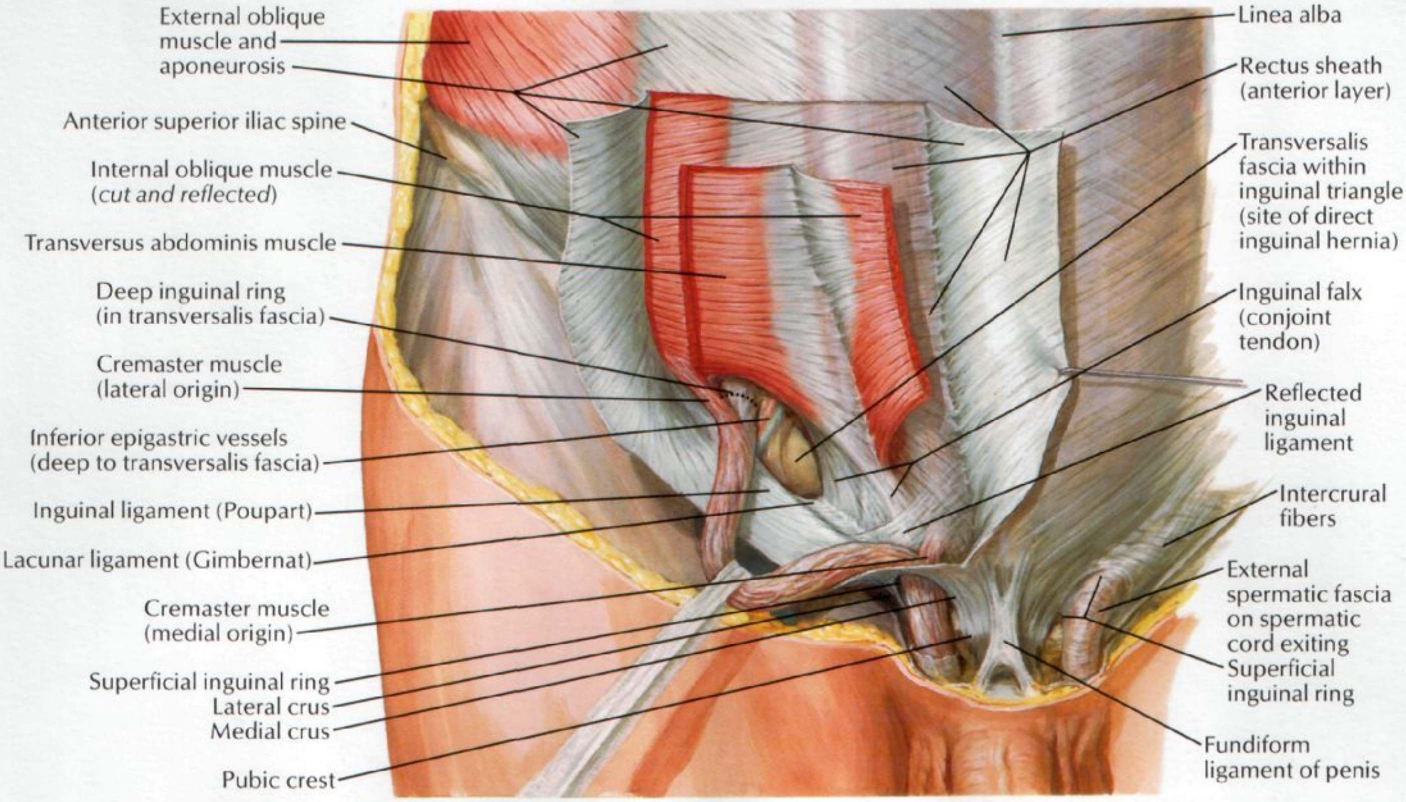
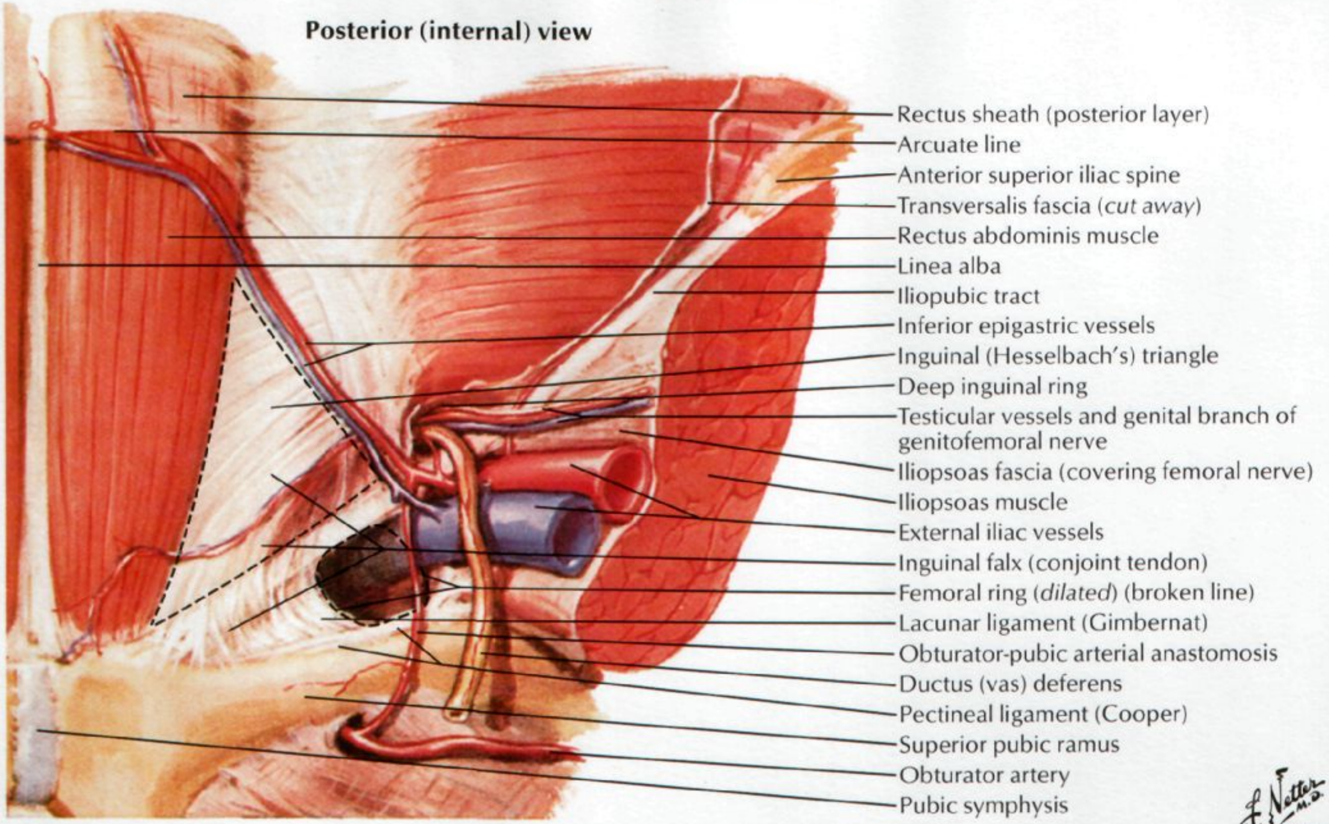
Inguinal Region: Dissections

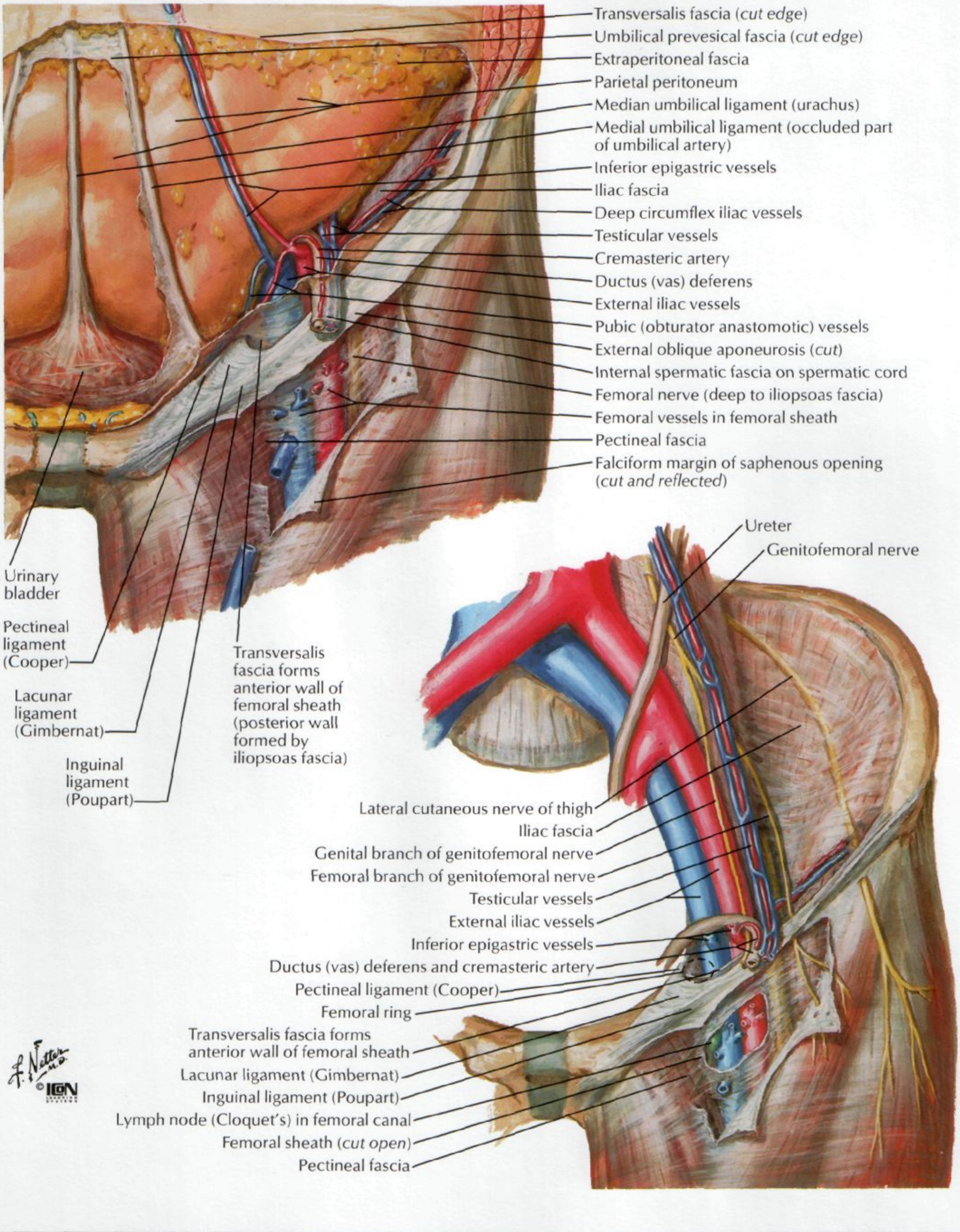

External oblique muscle and aponeurosis
Anterior superior iliac spine
Internal oblique muscle (*cut and reflected*)
Transversus abdominis muscle
Deep inguinal ring (in transversalis fascia)
Cremaster muscle (lateral origin)
Inferior epigastric vessels (deep to transversalis fascia)
Inguinal ligament (Poupart)
Lacunar ligament (Gimbernat)
Cremaster muscle (medial origin)
Superficial inguinal ring
Lateral crus
Medial crus
Pubic crest
Linea alba
Rectus sheath (anterior layer)
Transversalis fascia within inguinal triangle (site of direct inguinal hernia)
Inguinal falx (conjoint tendon)
Reflected inguinal ligament
Intercrural fibers
External spermatic fascia on spermatic cord exiting
Superficial inguinal ring
Fundiform ligament of penis

Anterior view

Posterior (internal) view


Rectus sheath (posterior layer)
Arcuate line
Anterior superior iliac spine
Transversalis fascia (*cut away*)
Rectus abdominis muscle
Linea alba
Iliopubic tract
Inferior epigastric vessels
Inguinal (Hesselbach's) triangle
Deep inguinal ring
Testicular vessels and genital branch of genitofemoral nerve
Iliopsoas fascia (covering femoral nerve)
Iliopsoas muscle
External iliac vessels
Inguinal falx (conjoint tendon)
Femoral ring (*dilated*) (broken line)
Lacunar ligament (Gimbernat)
Obturator-pubic arterial anastomosis
Ductus (vas) deferens
Pectineal ligament (Cooper)
Superior pubic ramus
Obturator artery
Pubic symphysis

Femoral Sheath and Inguinal Canal


Transversalis fascia (*cut edge*)
Umbilical prevesical fascia (*cut edge*)
Extraperitoneal fascia
Parietal peritoneum
Median umbilical ligament (urachus)
Medial umbilical ligament (occluded part of umbilical artery)
Inferior epigastric vessels
Iliac fascia
Deep circumflex iliac vessels
Testicular vessels
Cremasteric artery
Ductus (vas) deferens
External iliac vessels
Pubic (obturator anastomotic) vessels
External oblique aponeurosis (*cut*)
Internal spermatic fascia on spermatic cord
Femoral nerve (deep to iliopsoas fascia)
Femoral vessels in femoral sheath
Pectineal fascia
Falciform margin of saphenous opening (*cut and reflected*)
Urinary bladder
Pectineal ligament (Cooper)
Lacunar ligament (Gimbernat)
Inguinal ligament (Poupart)
Transversalis fascia forms anterior wall of femoral sheath (posterior wall formed by iliopsoas fascia)
Ureter
Genitofemoral nerve
Lateral cutaneous nerve of thigh
Iliac fascia
Genital branch of genitofemoral nerve
Femoral branch of genitofemoral nerve
Testicular vessels
External iliac vessels
Inferior epigastric vessels
Ductus (vas) deferens and cremasteric artery
Pectineal ligament (Cooper)
Femoral ring
Transversalis fascia forms anterior wall of femoral sheath
Lacunar ligament (Gimbernat)
Inguinal ligament (Poupart)
Lymph node (Cloquet's) in femoral canal
Femoral sheath (*cut open*)
Pectineal fascia
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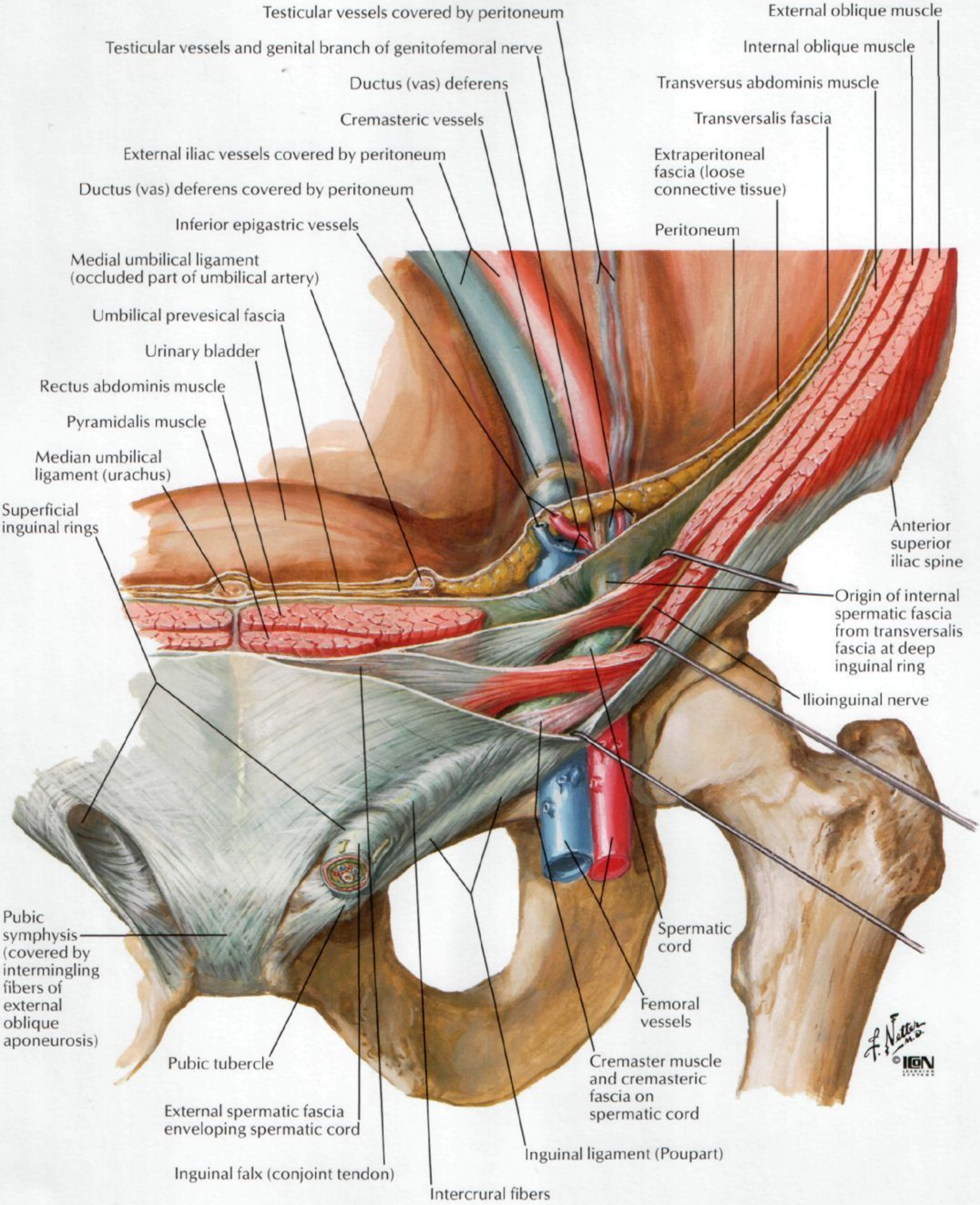
Testicular vessels covered by peritoneum
Testicular vessels and genital branch of genitofemoral nerve
Ductus (vas) deferens
Cremasteric vessels
External iliac vessels covered by peritoneum
Ductus (vas) deferens covered by peritoneum
Inferior epigastric vessels
Medial umbilical ligament (occluded part of umbilical artery)
Umbilical prevesical fascia
Urinary bladder
Rectus abdominis muscle
Pyramidalis muscle
Median umbilical ligament (urachus)
Superficial inguinal rings
External oblique muscle
Internal oblique muscle
Transversus abdominis muscle
Transversalis fascia
Extraperitoneal fascia (loose connective tissue)
Peritoneum
Anterior superior iliac spine
Origin of internal spermatic fascia from transversalis fascia at deep inguinal ring
Ilioinguinal nerve
Pubic symphysis (covered by intermingling fibers of external oblique aponeurosis)
Spermatic cord
Femoral vessels
Pubic tubercle
Cremaster muscle and cremasteric fascia on spermatic cord
External spermatic fascia enveloping spermatic cord
Inguinal ligament (Poupart)
Inguinal falx (conjoint tendon)
Intercrural fibers
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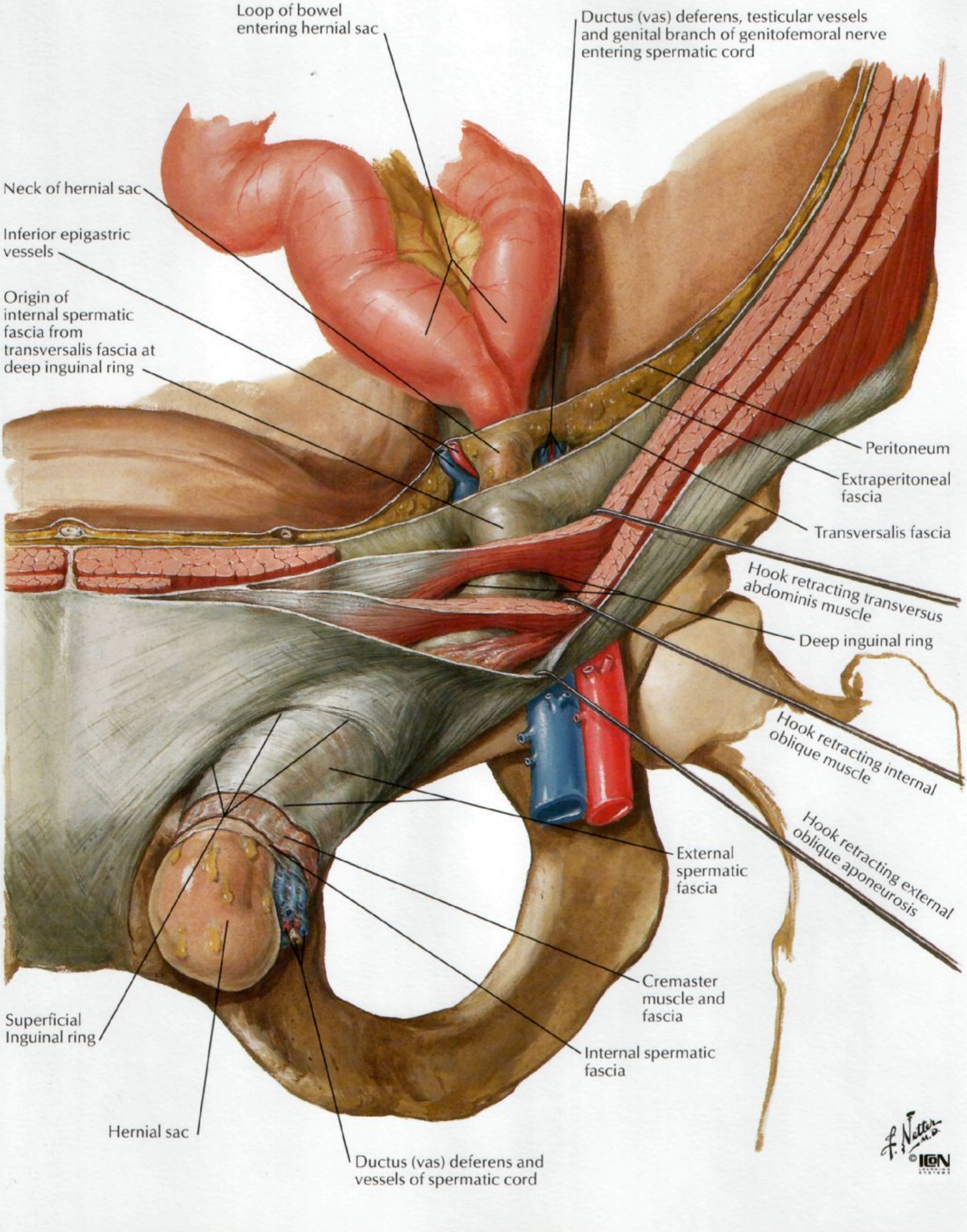
Indirect Inguinal Hernia

COMPARE TO PLATE 253


Loop of bowel entering hernial sac
Ductus (vas) deferens, testicular vessels and genital branch of genitofemoral nerve entering spermatic cord
Neck of hernial sac
Inferior epigastric vessels
Origin of internal spermatic fascia from transversalis fascia at deep inguinal ring
Peritoneum
Extraperitoneal fascia
Transversalis fascia
Hook retracting transversus abdominis muscle
Deep inguinal ring
Hook retracting internal oblique muscle
Hook retracting external oblique aponeurosis
External spermatic fascia
Cremaster muscle and fascia
Internal spermatic fascia
Superficial Inguinal ring
Hernial sac
Ductus (vas) deferens and vessels of spermatic cord
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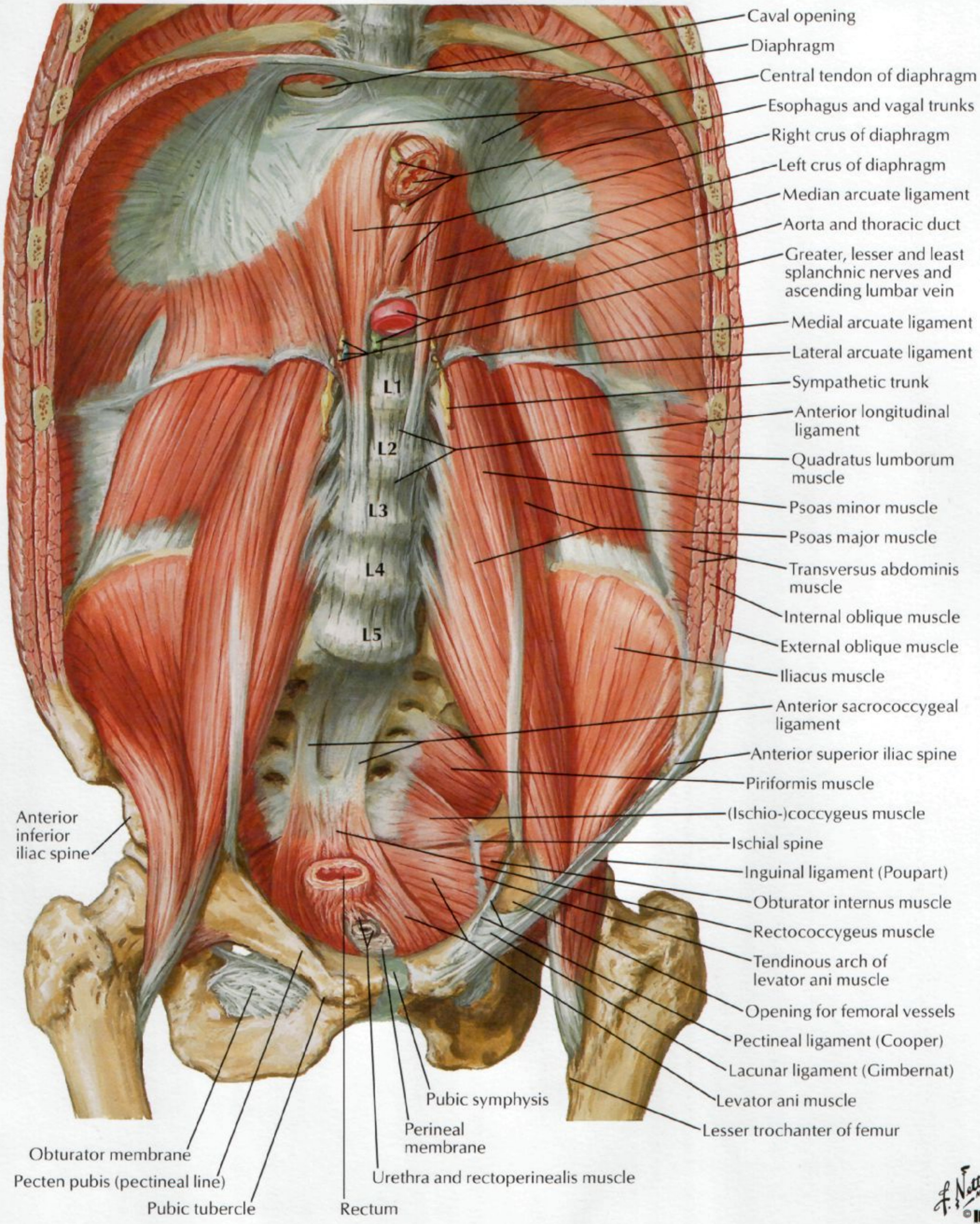
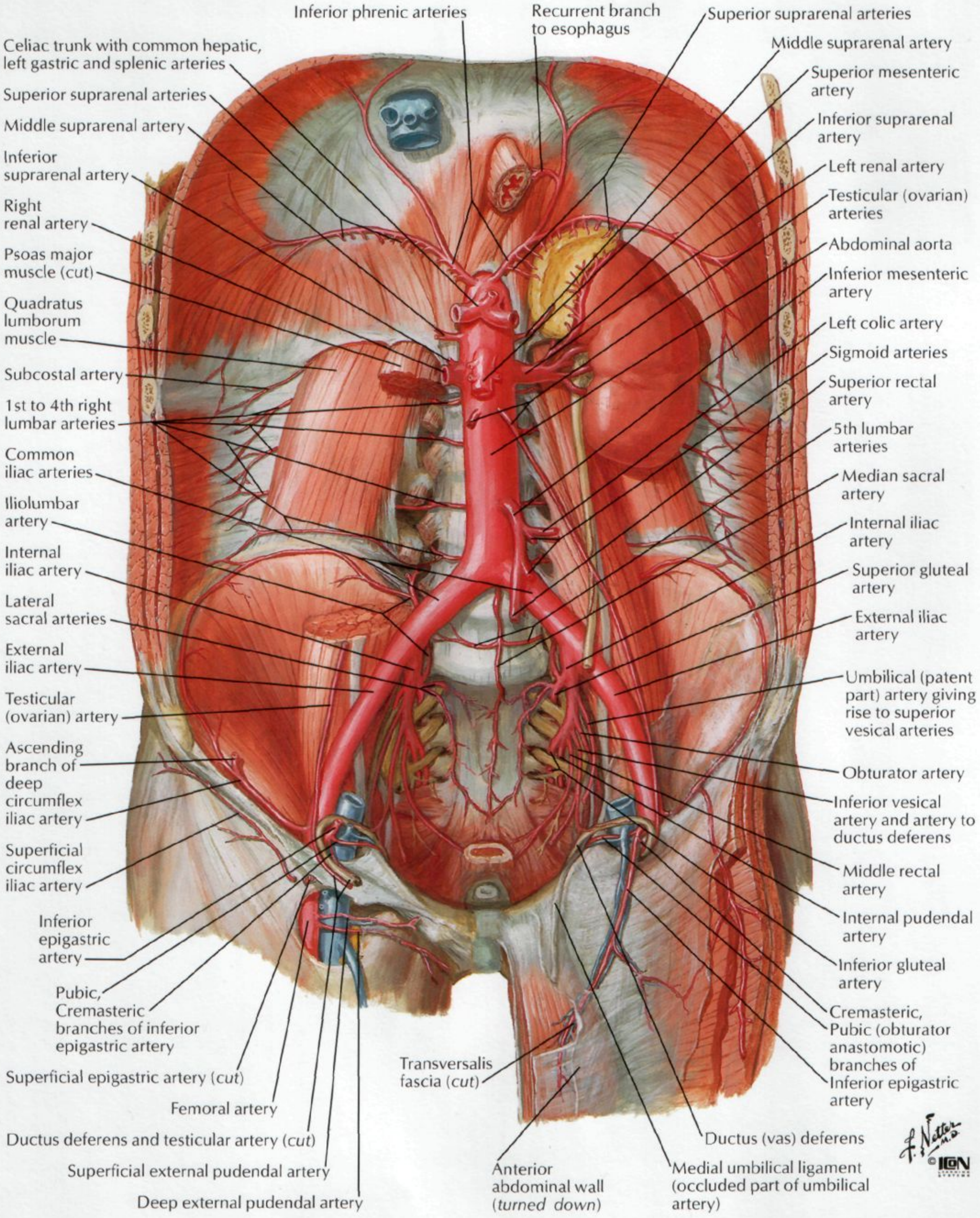
Posterior Abdominal Wall: Internal View

FOR DIAPHRAGM SEE ALSO PLATE 189


Caval opening
Diaphragm
Central tendon of diaphragm
Esophagus and vagal trunks
Right crus of diaphragm
Left crus of diaphragm
Median arcuate ligament
Aorta and thoracic duct
Greater, lesser and least splanchnic nerves and ascending lumbar vein
Medial arcuate ligament
Lateral arcuate ligament
Sympathetic trunk
Anterior longitudinal ligament
Quadratus lumborum muscle
Psoas minor muscle
Psoas major muscle
Transversus abdominis muscle
Internal oblique muscle
External oblique muscle
Iliacus muscle
Anterior sacrococcygeal ligament
Anterior superior iliac spine
Piriformis muscle
(Ischio-)coccygeus muscle
Ischial spine
Inguinal ligament (Poupart)
Obturator internus muscle
Rectococcygeus muscle
Tendinous arch of levator ani muscle
Opening for femoral vessels
Pectineal ligament (Cooper)
Lacunar ligament (Gimbernat)
Levator ani muscle
Lesser trochanter of femur
L1
L2
L3
L4
L5
Anterior inferior iliac spine
Pubic symphysis
Perineal membrane
Urethra and rectoperinealis muscle
Obturator membrane
Pecten pubis (pectineal line)
Pubic tubercle
Rectum

Arteries of Posterior Abdominal Wall


Inferior phrenic arteries
Recurrent branch to esophagus
Superior suprarenal arteries
Celiac trunk with common hepatic, left gastric and splenic arteries
Superior suprarenal arteries
Middle suprarenal artery
Inferior suprarenal artery
Right renal artery
Psoas major muscle (*cut*)
Quadratus lumborum muscle
Subcostal artery
1st to 4th right lumbar arteries
Common iliac arteries
Iliolumbar artery
Internal iliac artery
Lateral sacral arteries
External iliac artery
Testicular (ovarian) artery
Ascending branch of deep circumflex iliac artery
Superficial circumflex iliac artery
Inferior epigastric artery
Pubic, Cremasteric branches of inferior epigastric artery
Superficial epigastric artery (*cut*)
Femoral artery
Ductus deferens and testicular artery (*cut*)
Superficial external pudendal artery
Deep external pudendal artery
Middle suprarenal artery
Superior mesenteric artery
Inferior suprarenal artery
Left renal artery
Testicular (ovarian) arteries
Abdominal aorta
Inferior mesenteric artery
Left colic artery
Sigmoid arteries
Superior rectal artery
5th lumbar arteries
Median sacral artery
Internal iliac artery
Superior gluteal artery
External iliac artery
Umbilical (patent part) artery giving rise to superior vesical arteries
Obturator artery
Inferior vesical artery and artery to ductus deferens
Middle rectal artery
Internal pudendal artery
Inferior gluteal artery
Cremasteric, Pubic (obturator anastomotic) branches of Inferior epigastric artery
Transversalis fascia (*cut*)
Anterior abdominal wall (*turned down*)
Ductus (vas) deferens
Medial umbilical ligament (occluded part of umbilical artery)
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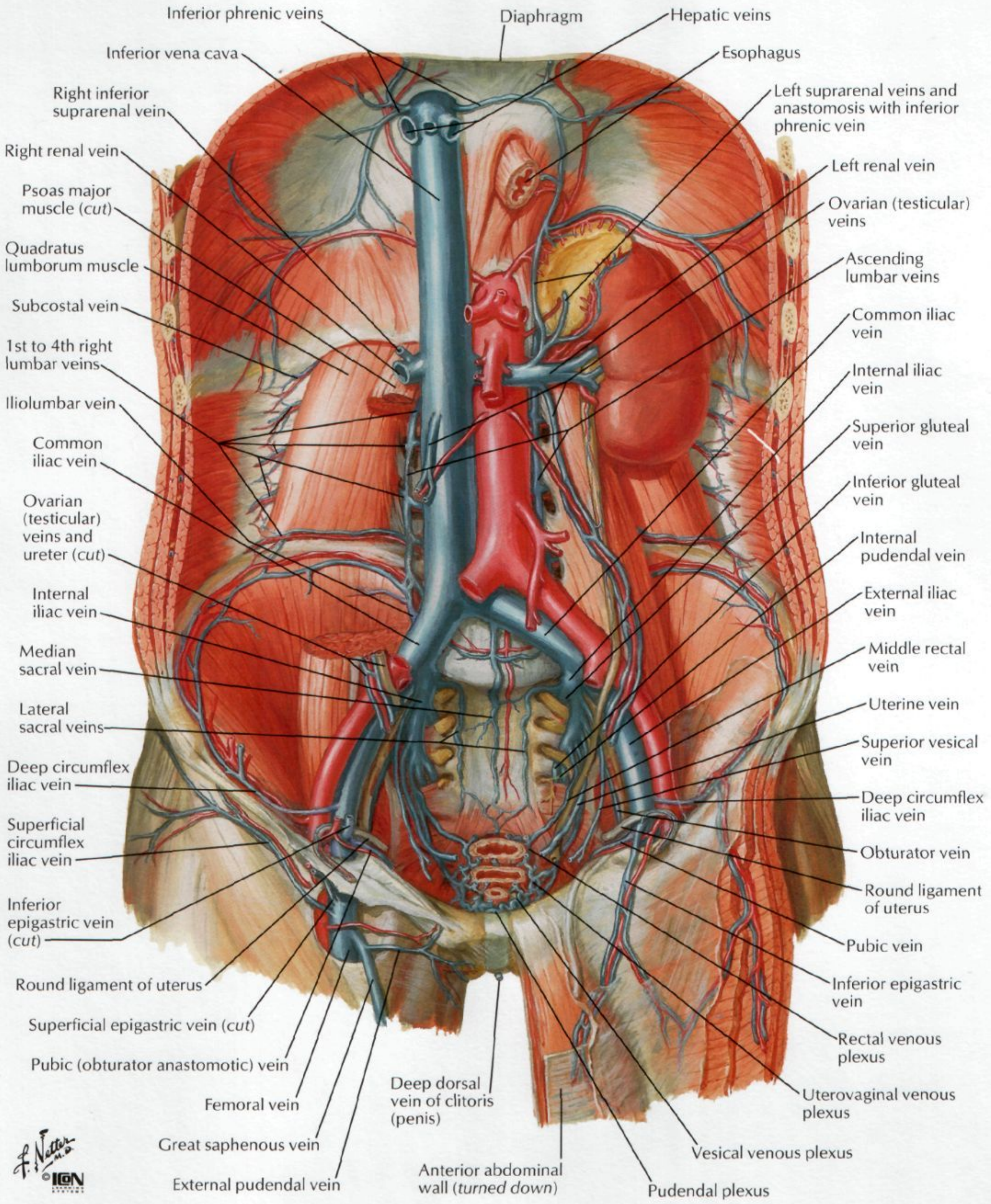
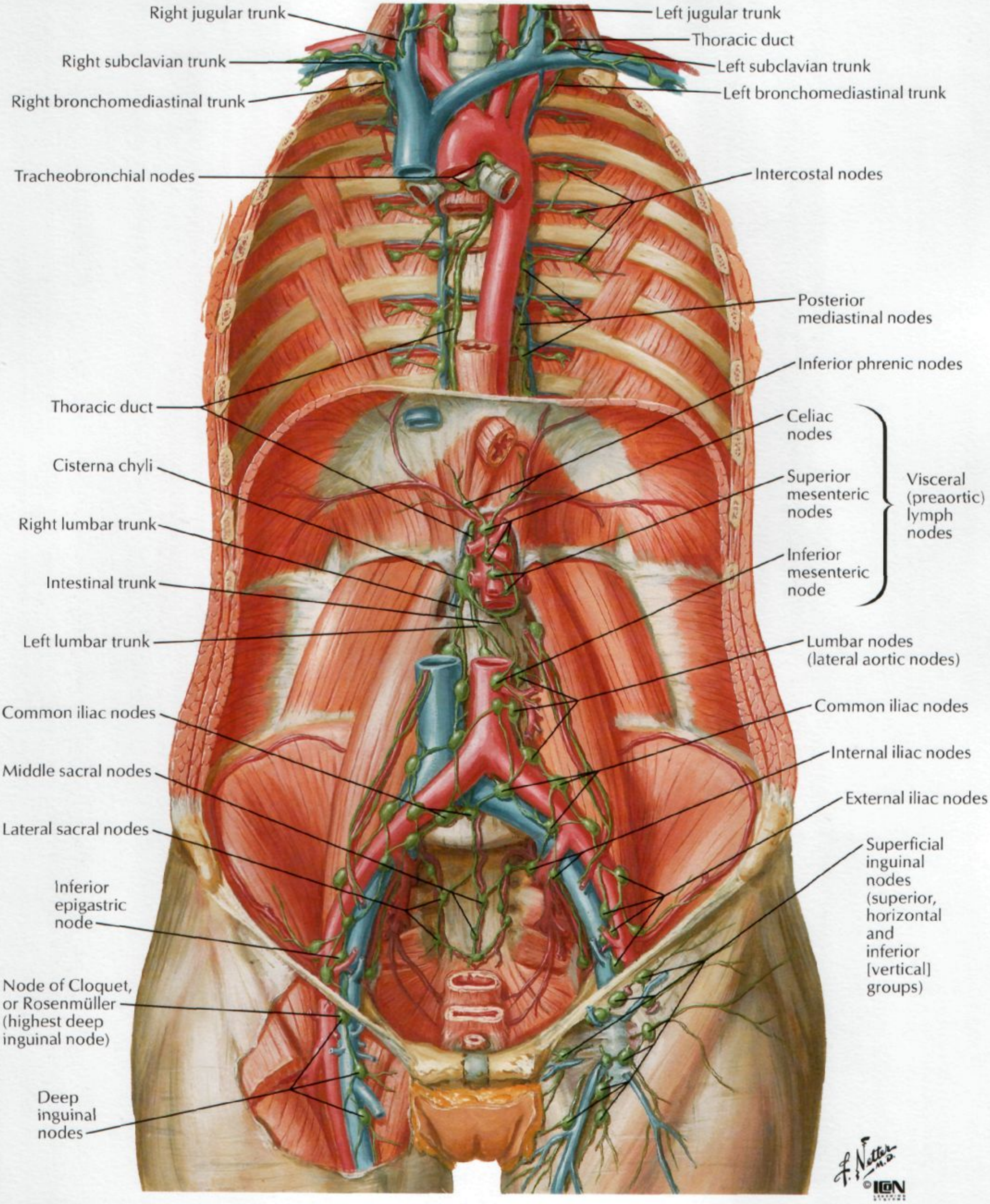
Veins of Posterior Abdominal Wall

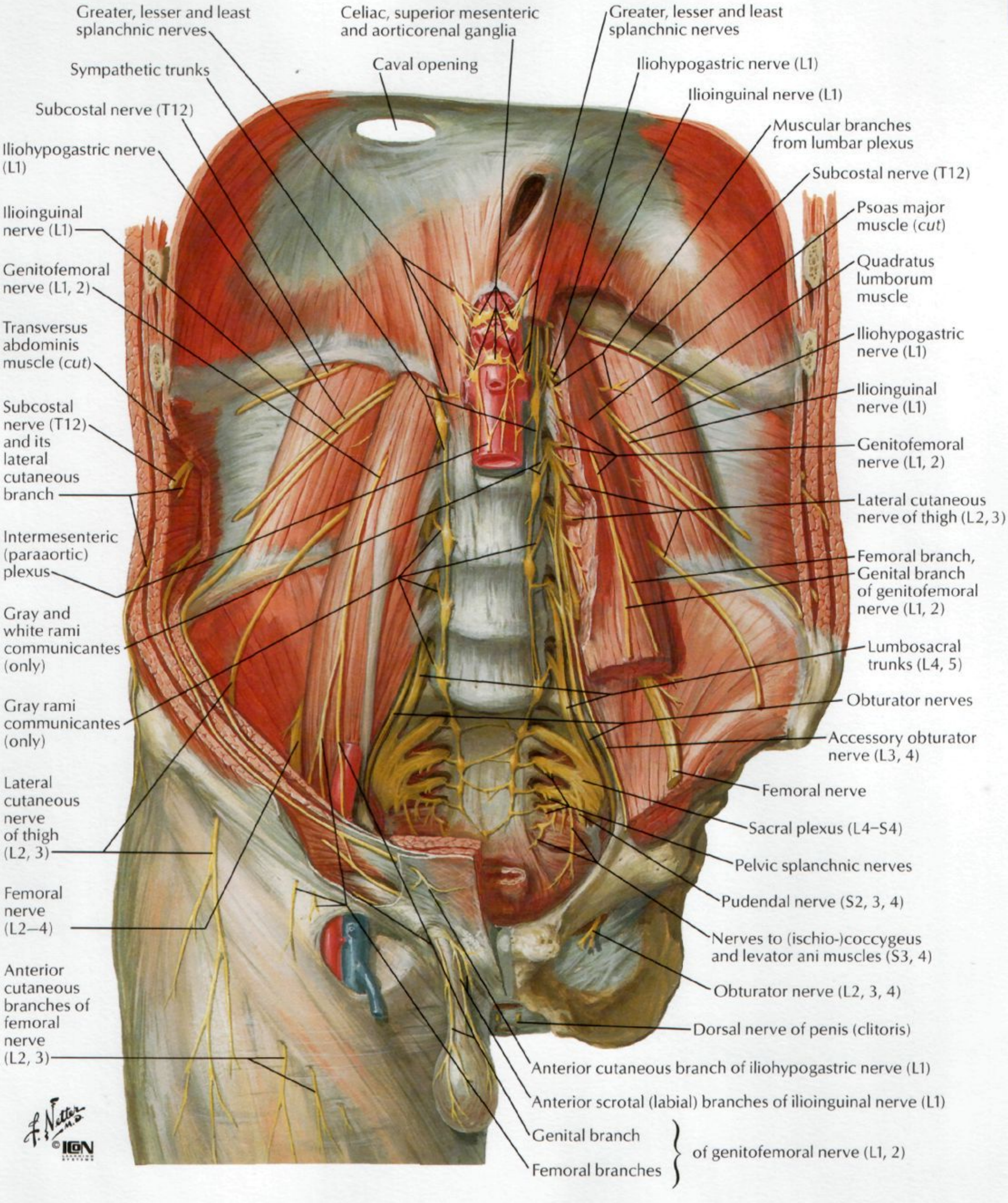


Lymph Vessels and Nodes of Posterior Abdominal Wall

SEE ALSO PLATE 387



Nerves of Posterior Abdominal Wall


Greater, lesser and least splanchnic nerves
Celiac, superior mesenteric and aorticorenal ganglia
Caval opening
Greater, lesser and least splanchnic nerves
Sympathetic trunks
Subcostal nerve (T12)
Iliohypogastric nerve (L1)
Ilioinguinal nerve (L1)
Genitofemoral nerve (L1, 2)
Transversus abdominis muscle (*cut*)
Subcostal nerve (T12) and its lateral cutaneous branch
Intermesenteric (paraaortic) plexus
Gray and white rami communicantes (only)
Gray rami communicantes (only)
Lateral cutaneous nerve of thigh (L2, 3)
Femoral nerve (L2–4)
Anterior cutaneous branches of femoral nerve (L2, 3)
Iliohypogastric nerve (L1)
Ilioinguinal nerve (L1)
Muscular branches from lumbar plexus
Subcostal nerve (T12)
Psoas major muscle (*cut*)
Quadratus lumborum muscle
Iliohypogastric nerve (L1)
Ilioinguinal nerve (L1)
Genitofemoral nerve (L1, 2)
Lateral cutaneous nerve of thigh (L2, 3)
Femoral branch, Genital branch of genitofemoral nerve (L1, 2)
Lumbosacral trunks (L4, 5)
Obturator nerves
Accessory obturator nerve (L3, 4)
Femoral nerve
Sacral plexus (L4–S4)
Pelvic splanchnic nerves
Pudendal nerve (S2, 3, 4)
Nerves to (ischio-)coccygeus and levator ani muscles (S3, 4)
Obturator nerve (L2, 3, 4)
Dorsal nerve of penis (clitoris)
Anterior cutaneous branch of iliohypogastric nerve (L1)
Anterior scrotal (labial) branches of ilioinguinal nerve (L1)
Genital branch
Femoral branches
of genitofemoral nerve (L1, 2)
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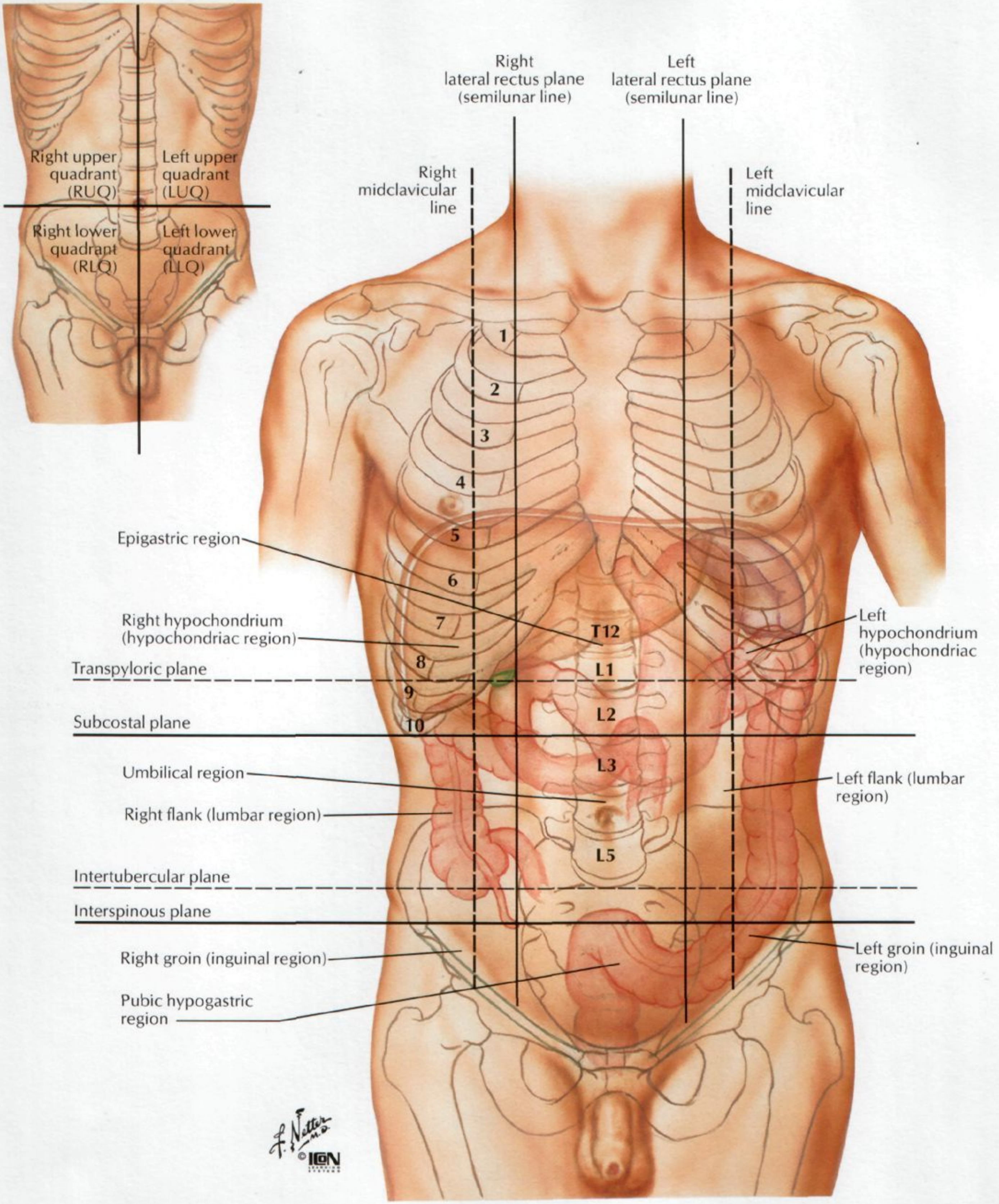
Regions and Planes of Abdomen


Right upper quadrant (RUQ)
Left upper quadrant (LUQ)
Right lower quadrant (RLQ)
Left lower quadrant (LLQ)
Right lateral rectus plane (semilunar line)
Left lateral rectus plane (semilunar line)
Right midclavicular line
Left midclavicular line
1
2
3
4
5
6
7
8
9
10
T12
L1
L2
L3
L5
Epigastric region
Right hypochondrium (hypochondriac region)
Left hypochondrium (hypochondriac region)
Transpyloric plane
Subcostal plane
Umbilical region
Right flank (lumbar region)
Left flank (lumbar region)
Intertubercular plane
Interspinous plane
Right groin (inguinal region)
Left groin (inguinal region)
Pubic hypogastric region
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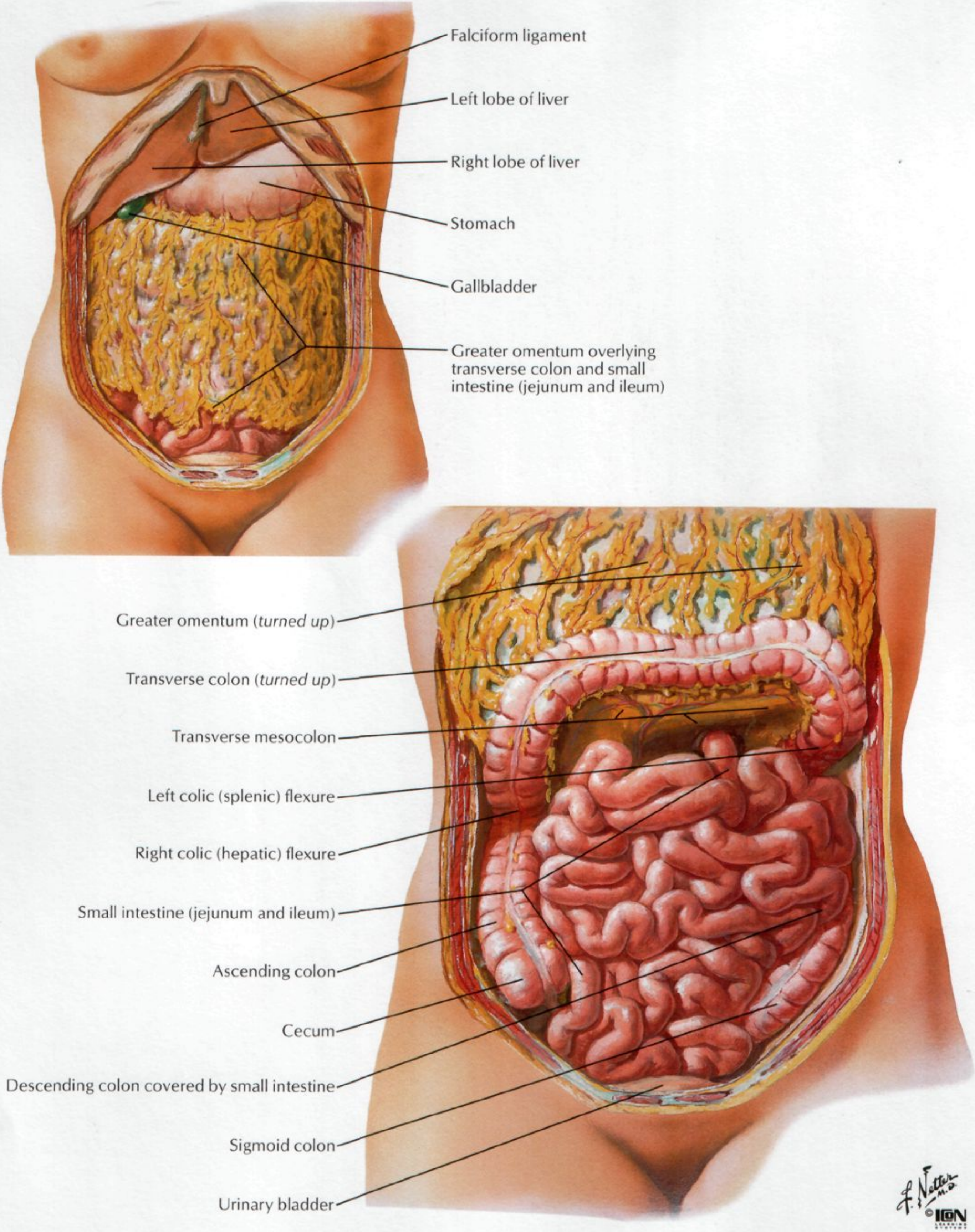
Greater Omentum and Abdominal Viscera

SEE ALSO PLATES 267, 335, 337


Falciform ligament
Left lobe of liver
Right lobe of liver
Stomach
Gallbladder
Greater omentum overlying transverse colon and small intestine (jejunum and ileum)
Greater omentum (*turned up*)
Transverse colon (*turned up*)
Transverse mesocolon
Left colic (splenic) flexure
Right colic (hepatic) flexure
Small intestine (jejunum and ileum)
Ascending colon
Cecum
Descending colon covered by small intestine
Sigmoid colon
Urinary bladder
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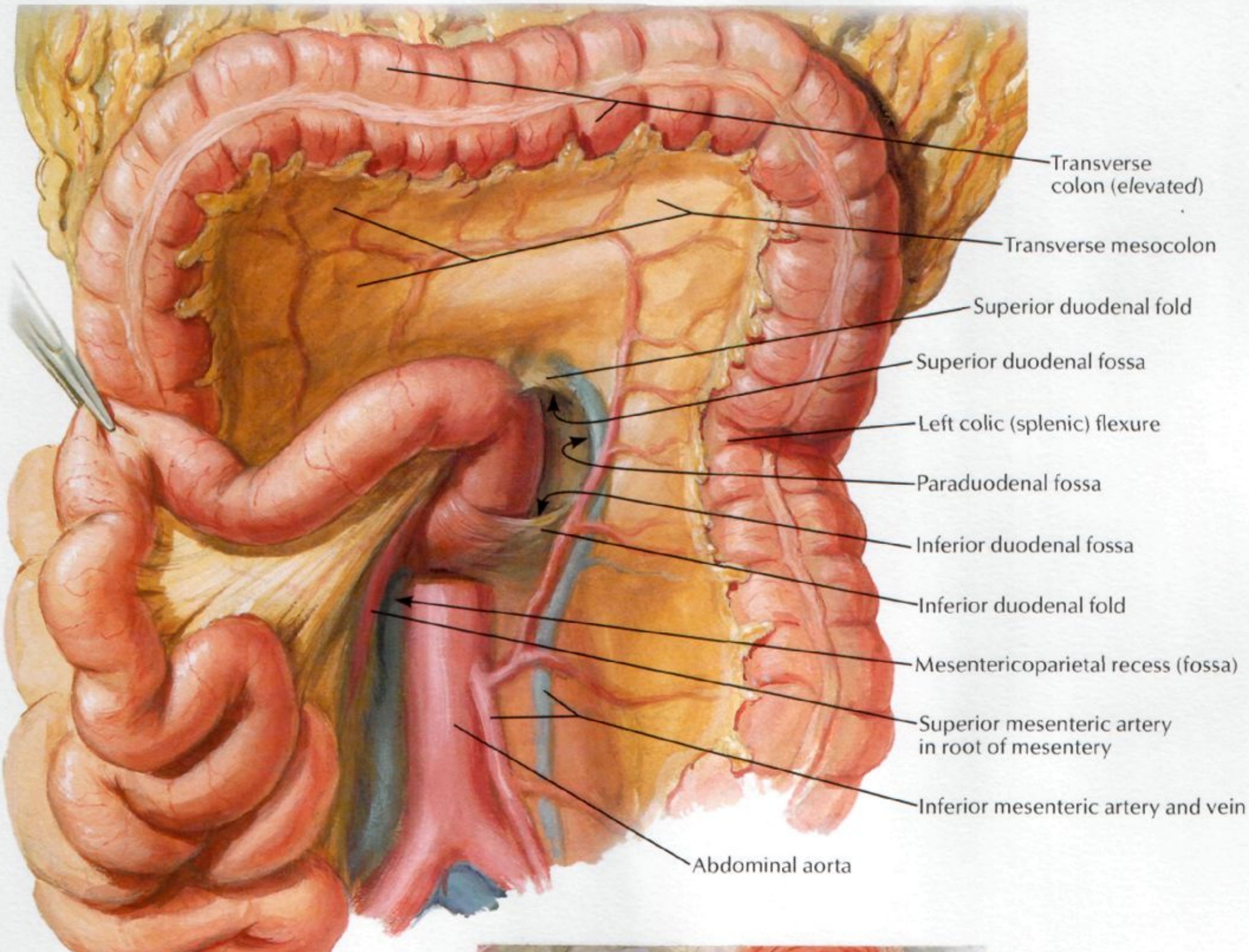
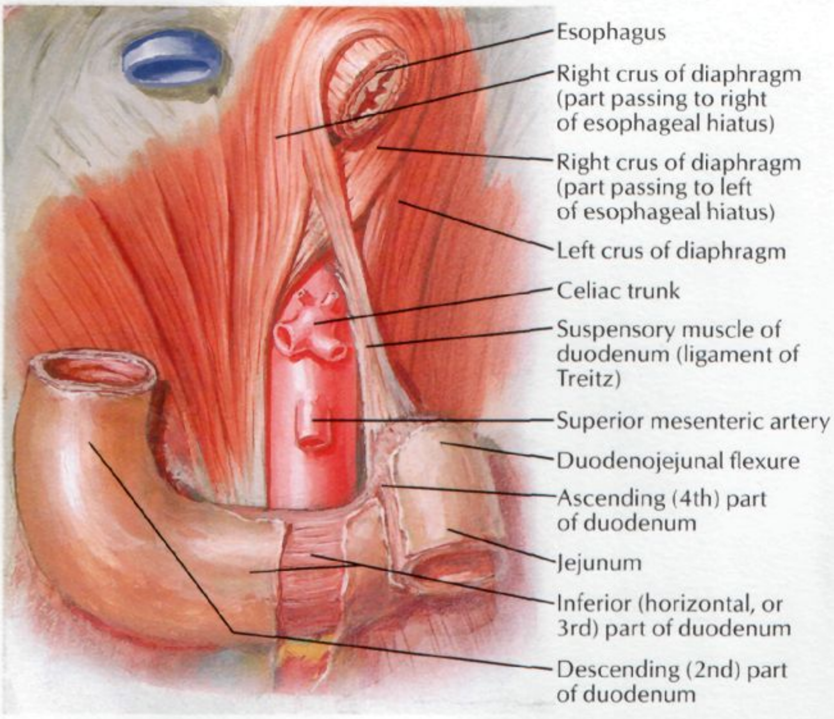
Mesenteric Relations of Intestines


Transverse colon (*elevated*)
Transverse mesocolon
Superior duodenal fold
Superior duodenal fossa
Left colic (splenic) flexure
Paraduodenal fossa
Inferior duodenal fossa
Inferior duodenal fold
Mesentericoparietal recess (fossa)
Superior mesenteric artery in root of mesentery
Inferior mesenteric artery and vein
Abdominal aorta

Exposure of suspensory muscle of duodenum (ligament of Treitz)


Esophagus
Right crus of diaphragm (part passing to right of esophageal hiatus)
Right crus of diaphragm (part passing to left of esophageal hiatus)
Left crus of diaphragm
Celiac trunk
Suspensory muscle of duodenum (ligament of Treitz)
Superior mesenteric artery
Duodenojejunal flexure
Ascending (4th) part of duodenum
Jejunum
Inferior (horizontal, or 3rd) part of duodenum
Descending (2nd) part of duodenum

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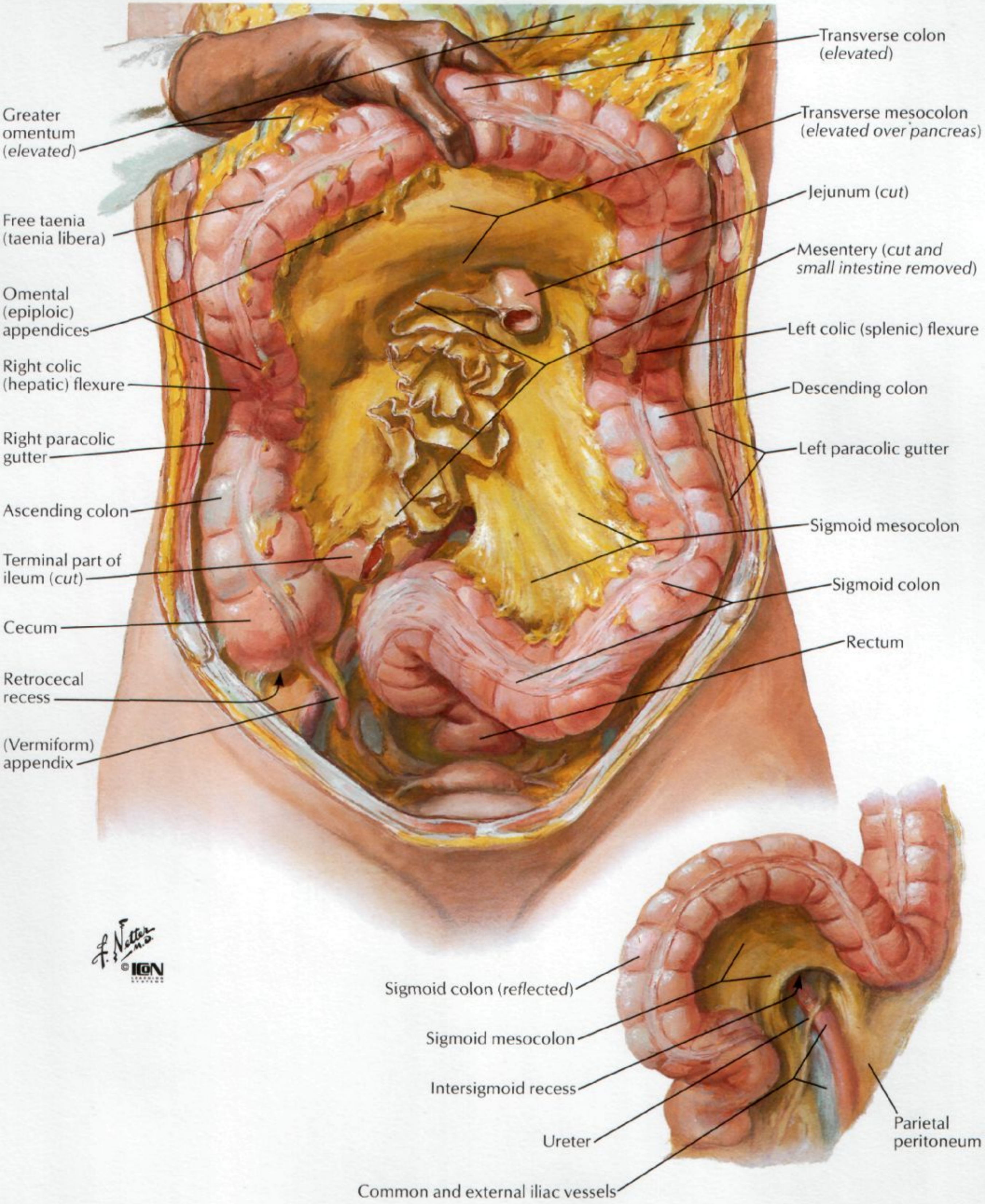
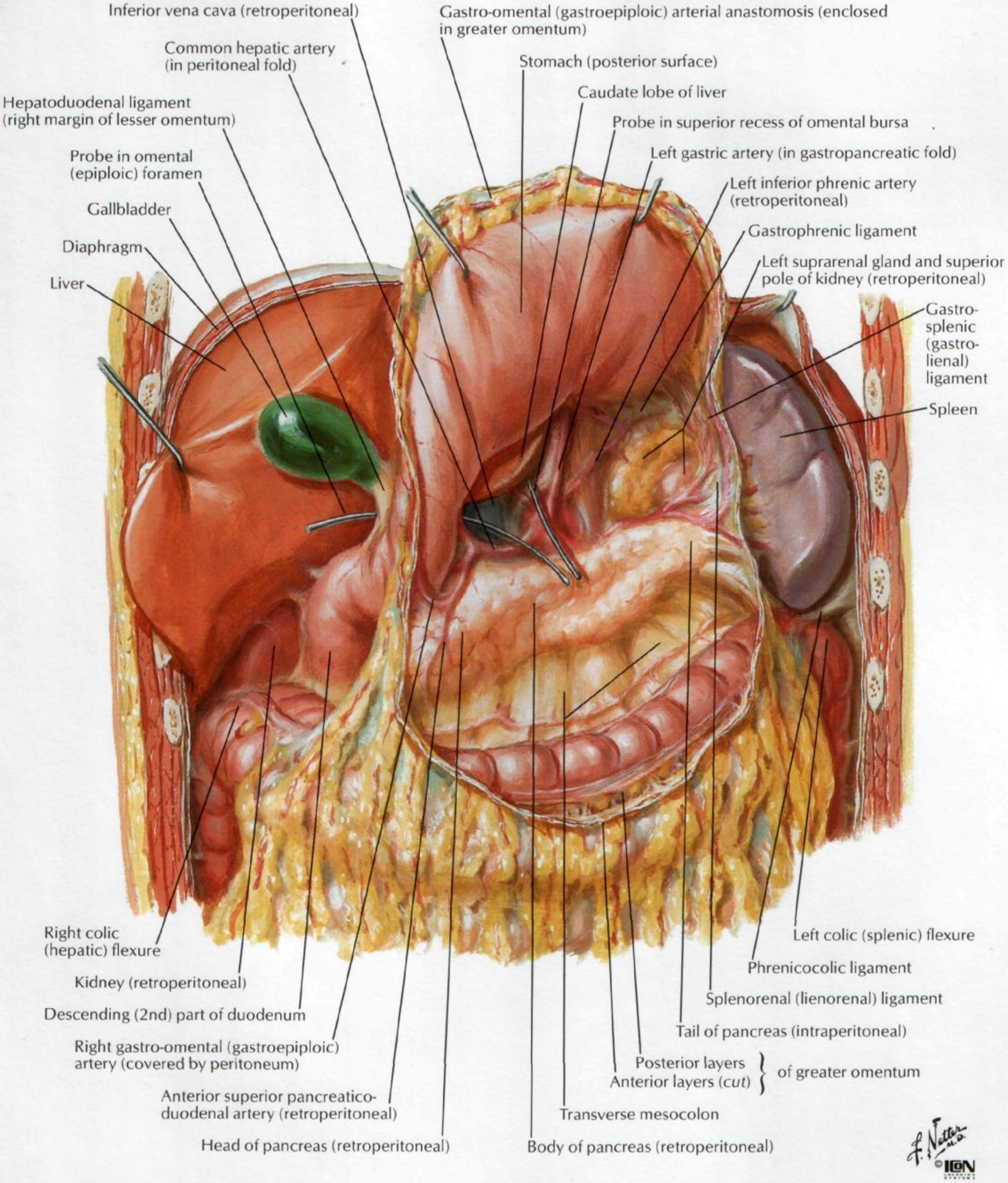
Mesenteric Relations of Intestines (continued)


Greater omentum (*elevated*)
Free taenia (taenia libera)
Omental (epiploic) appendices
Right colic (hepatic) flexure
Right paracolic gutter
Ascending colon
Terminal part of ileum (*cut*)
Cecum
Retrocecal recess
(Vermiform) appendix
Transverse colon (*elevated*)
Transverse mesocolon (*elevated over pancreas*)
Jejunum (*cut*)
Mesentery (*cut and small intestine removed*)
Left colic (splenic) flexure
Descending colon
Left paracolic gutter
Sigmoid mesocolon
Sigmoid colon
Rectum
Sigmoid colon (*reflected*)
Sigmoid mesocolon
Intersigmoid recess
Ureter
Common and external iliac vessels
Parietal peritoneum

Omental Bursa: Stomach Reflected


Inferior vena cava (retroperitoneal)
Gastro-omental (gastroepiploic) arterial anastomosis (enclosed in greater omentum)
Common hepatic artery (in peritoneal fold)
Stomach (posterior surface)
Caudate lobe of liver
Hepatoduodenal ligament (right margin of lesser omentum)
Probe in superior recess of omental bursa
Probe in omental (epiploic) foramen
Left gastric artery (in gastropancreatic fold)
Left inferior phrenic artery (retroperitoneal)
Gallbladder
Gastrophrenic ligament
Diaphragm
Left suprarenal gland and superior pole of kidney (retroperitoneal)
Liver
Gastrosplenic (gastrolienal) ligament
Spleen
Right colic (hepatic) flexure
Left colic (splenic) flexure
Phrenicocolic ligament
Kidney (retroperitoneal)
Splenorenal (lienorenal) ligament
Descending (2nd) part of duodenum
Tail of pancreas (intraperitoneal)
Right gastro-omental (gastroepiploic) artery (covered by peritoneum)
Posterior layers
Anterior layers (cut)
of greater omentum
Anterior superior pancreaticoduodenal artery (retroperitoneal)
Transverse mesocolon
Head of pancreas (retroperitoneal)
Body of pancreas (retroperitoneal)
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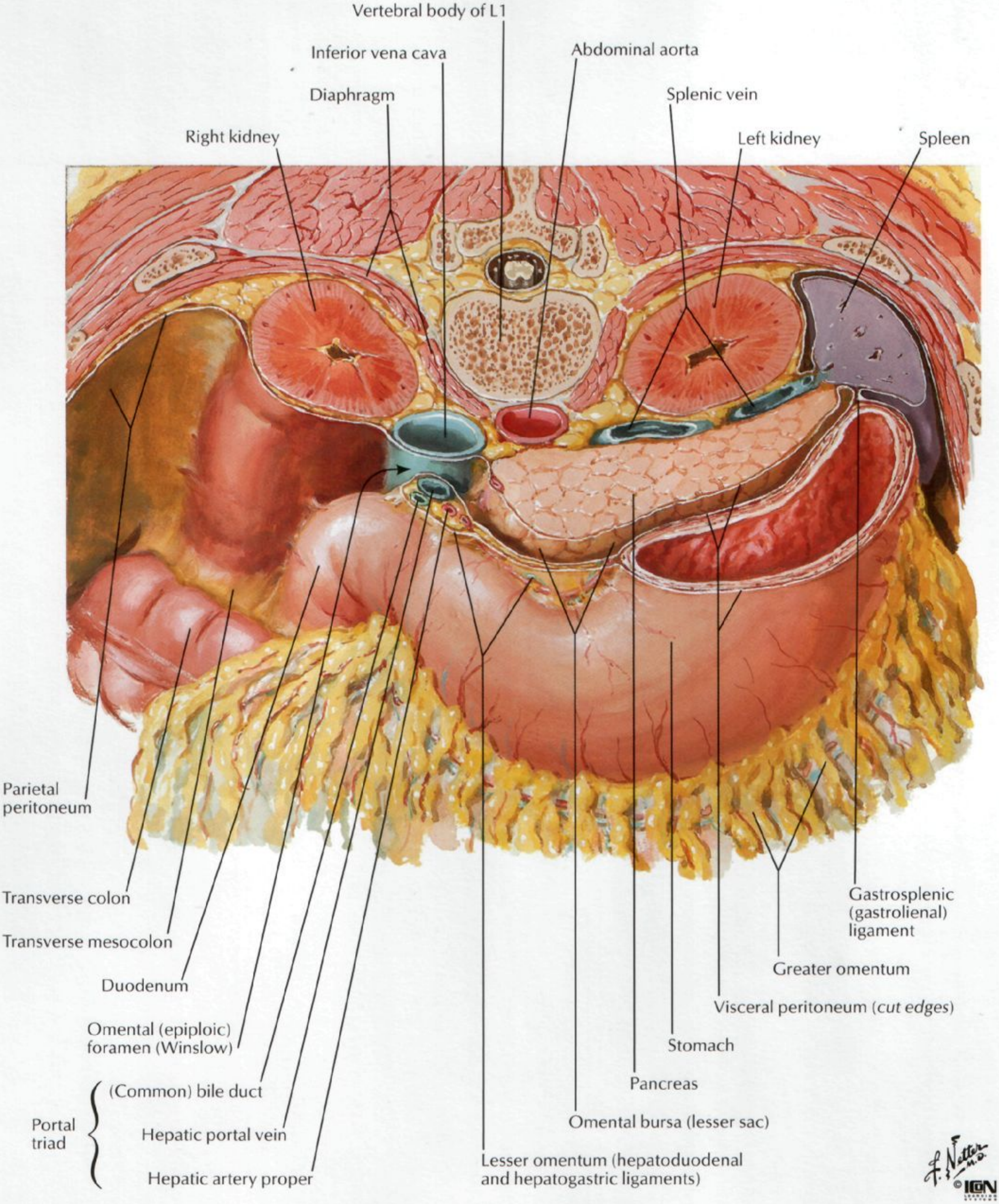
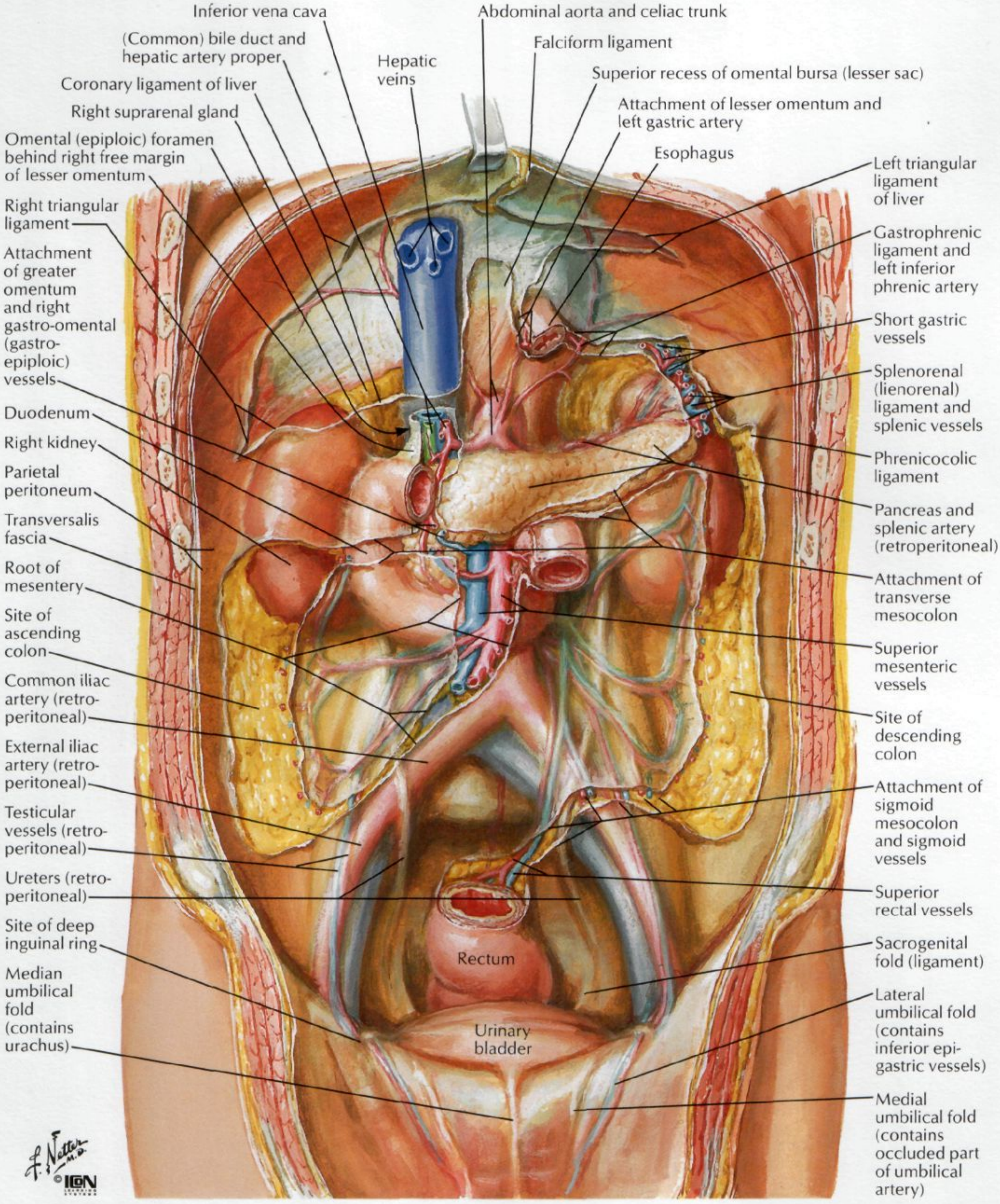
Omental Bursa: Cross Section

SEE ALSO PLATE 336



Peritoneum of Posterior Abdominal Wall


Inferior vena cava
(Common) bile duct and hepatic artery proper
Hepatic veins
Coronary ligament of liver
Right suprarenal gland
Omental (epiploic) foramen behind right free margin of lesser omentum
Right triangular ligament
Attachment of greater omentum and right gastro-omental (gastro-epiploic) vessels
Duodenum
Right kidney
Parietal peritoneum
Transversalis fascia
Root of mesentery
Site of ascending colon
Common iliac artery (retro-peritoneal)
External iliac artery (retro-peritoneal)
Testicular vessels (retro-peritoneal)
Ureters (retro-peritoneal)
Site of deep inguinal ring
Median umbilical fold (contains urachus)
Abdominal aorta and celiac trunk
Falciform ligament
Superior recess of omental bursa (lesser sac)
Attachment of lesser omentum and left gastric artery
Esophagus
Left triangular ligament of liver
Gastrophrenic ligament and left inferior phrenic artery
Short gastric vessels
Splenorenal (lienorenal) ligament and splenic vessels
Phrenicocolic ligament
Pancreas and splenic artery (retroperitoneal)
Attachment of transverse mesocolon
Superior mesenteric vessels
Site of descending colon
Attachment of sigmoid mesocolon and sigmoid vessels
Superior rectal vessels
Sacrogenital fold (ligament)
Lateral umbilical fold (contains inferior epi-gastric vessels)
Medial umbilical fold (contains occluded part of umbilical artery)
Rectum
Urinary bladder
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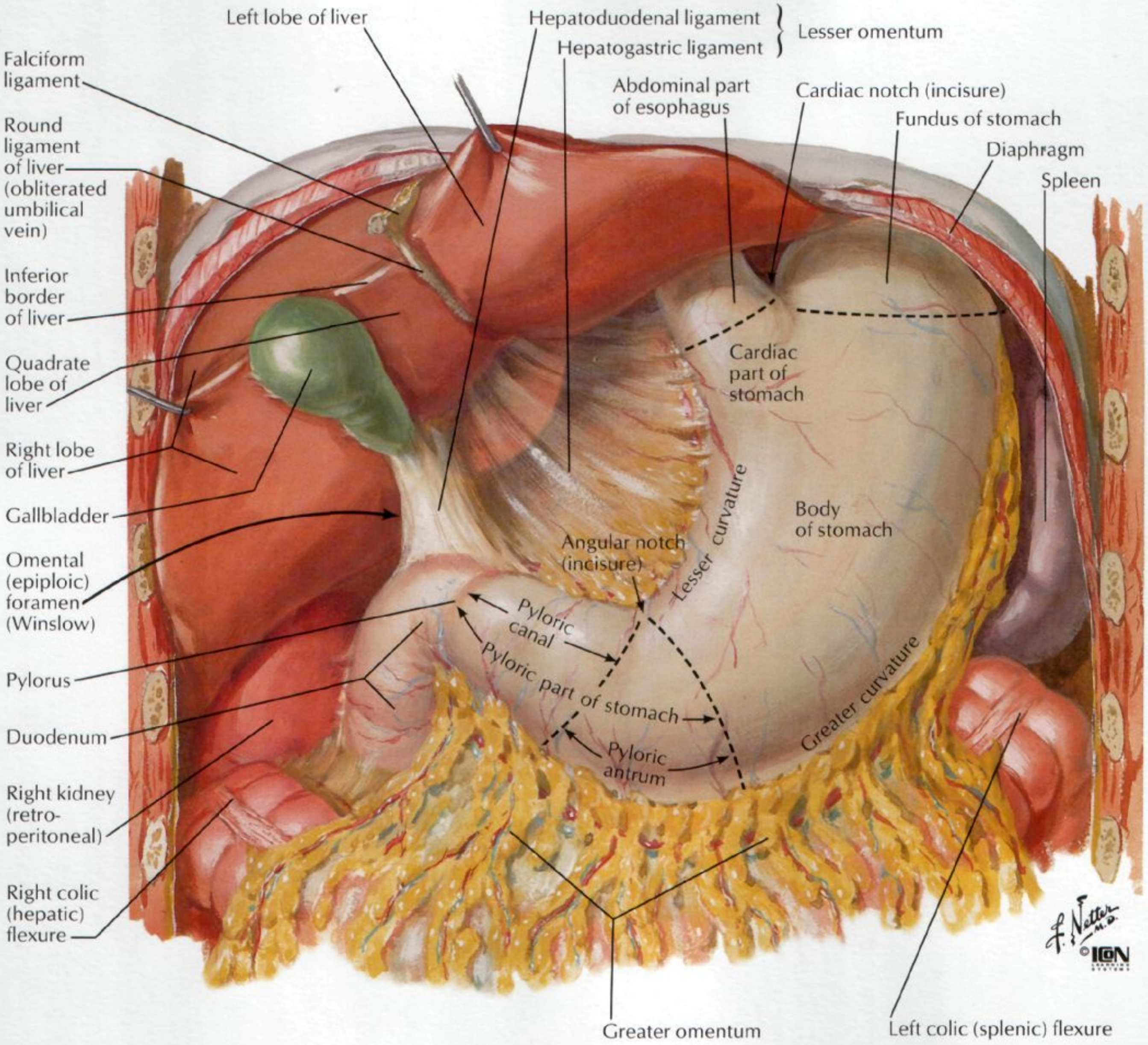
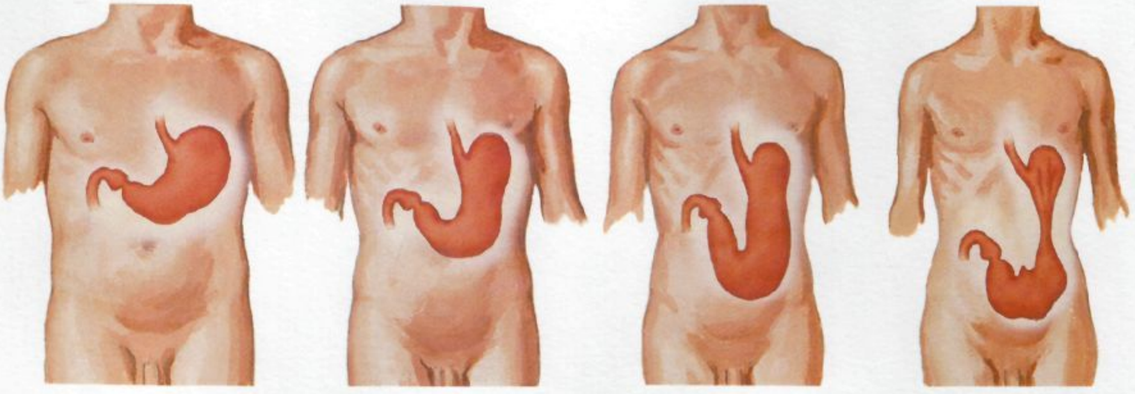
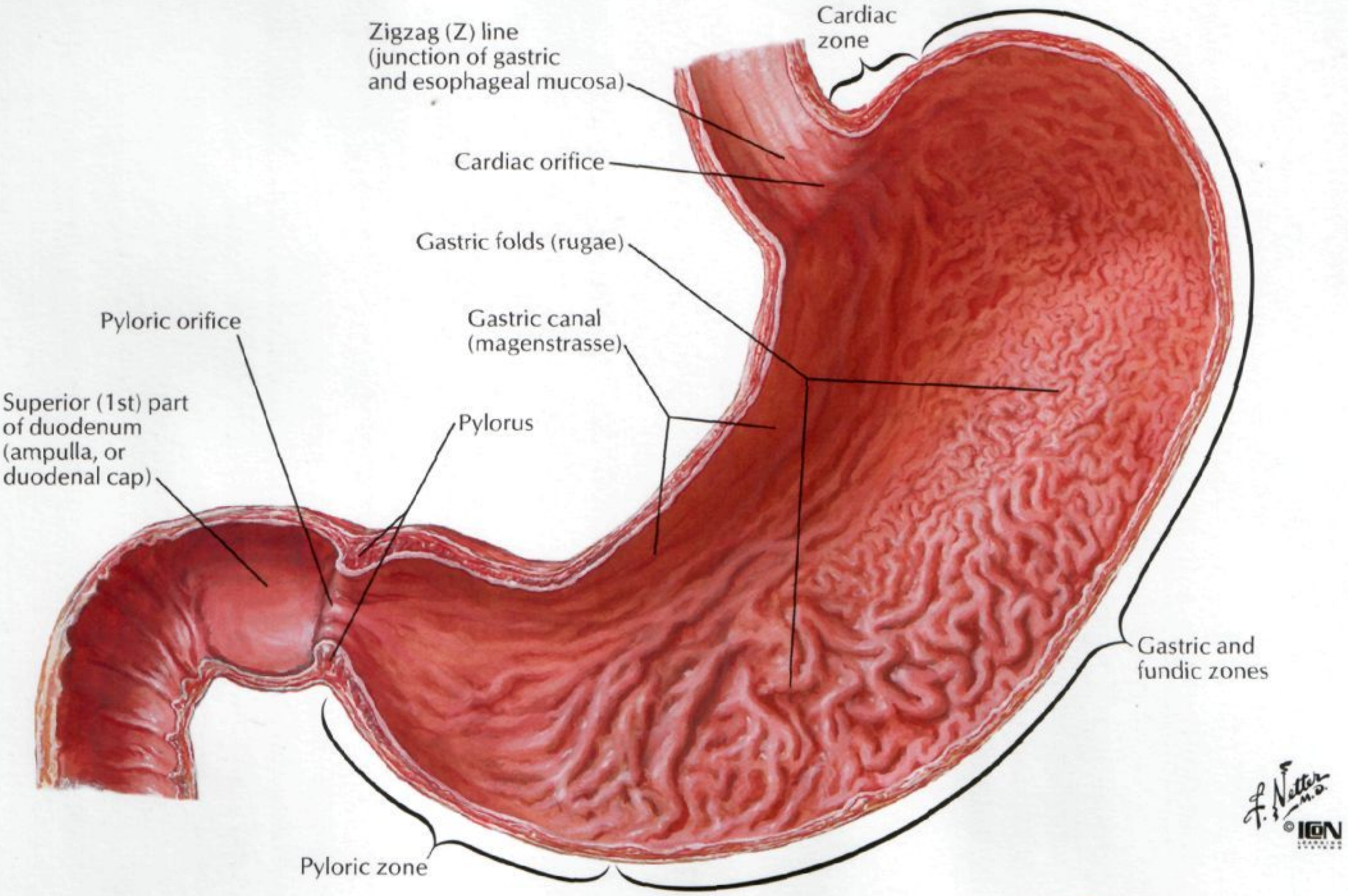


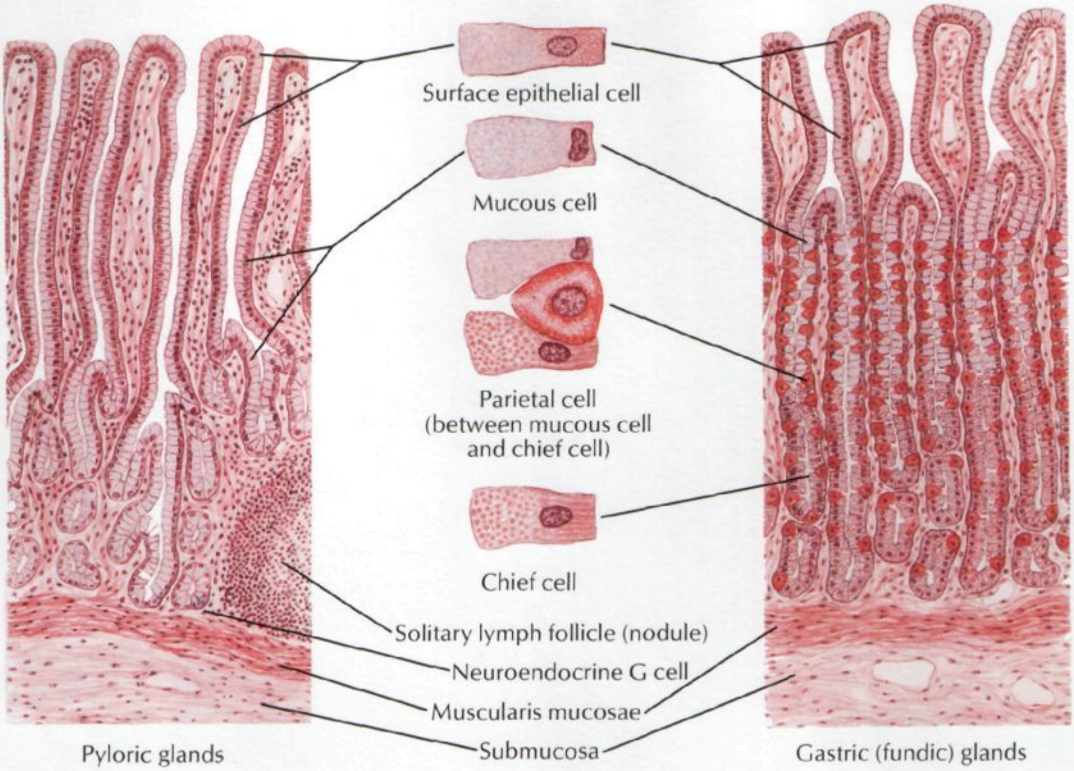
Variations in position and contour of stomach in relation to body habitus


Hypertonic stomach
Orthotonic stomach
Hypotonic stomach
Atonic stomach

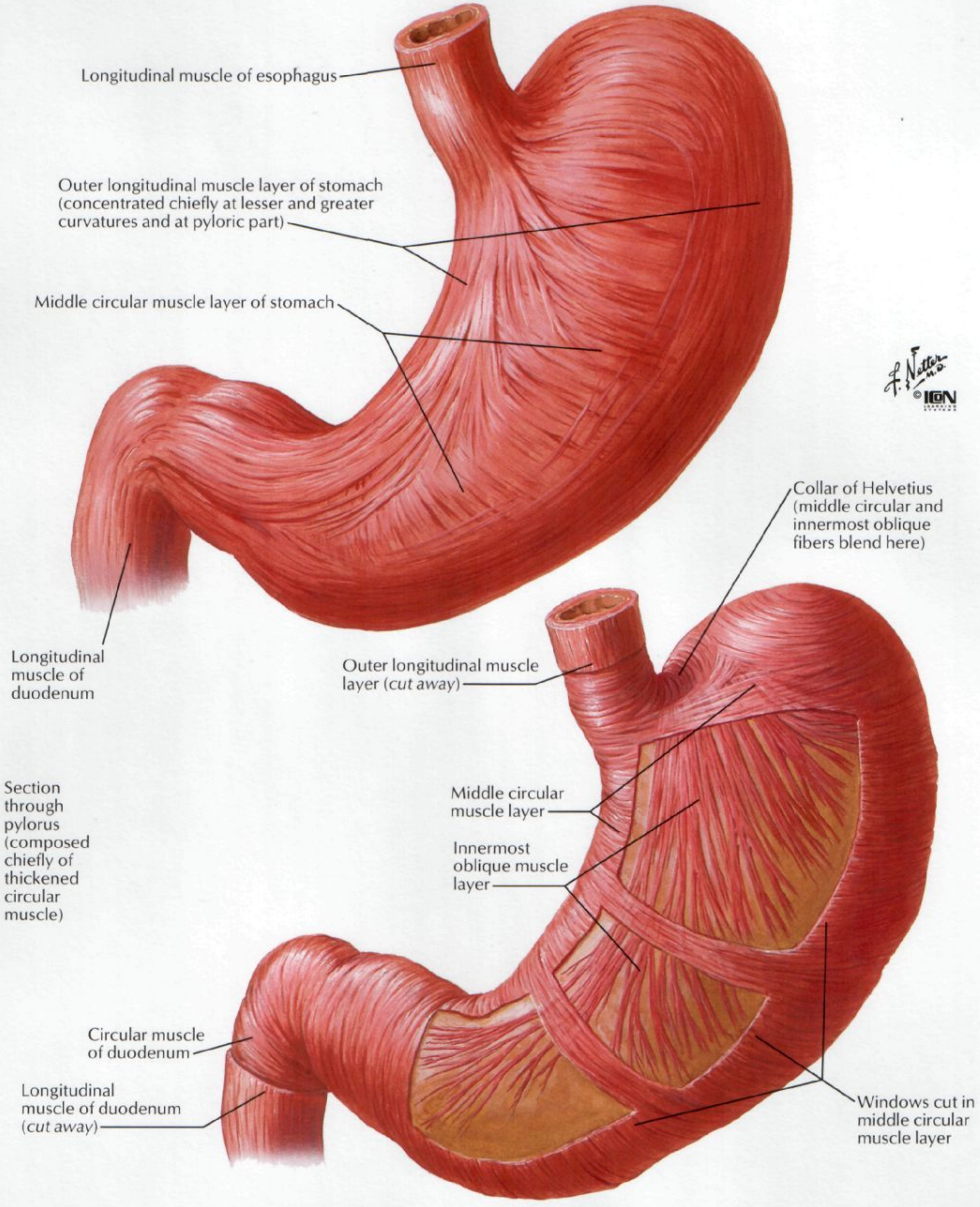
Mucosa of Stomach

SEE ALSO PLATE 232

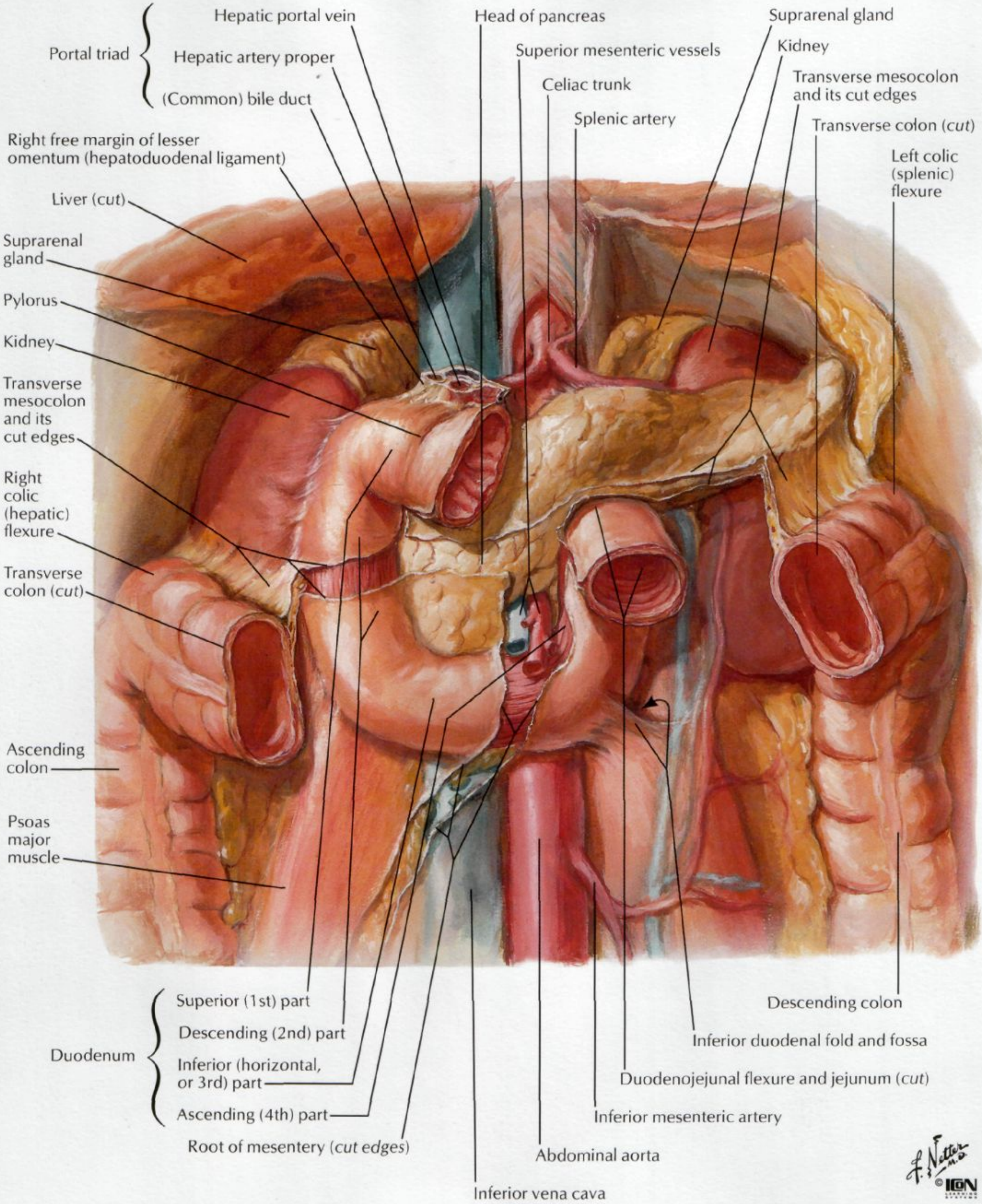

Zigzag (Z) line (junction of gastric and esophageal mucosa)
Cardiac zone
Cardiac orifice
Gastric folds (rugae)
Pyloric orifice
Gastric canal (magenstrasse)
Superior (1st) part of duodenum (ampulla, or duodenal cap)
Pylorus
Gastric and fundic zones
Pyloric zone



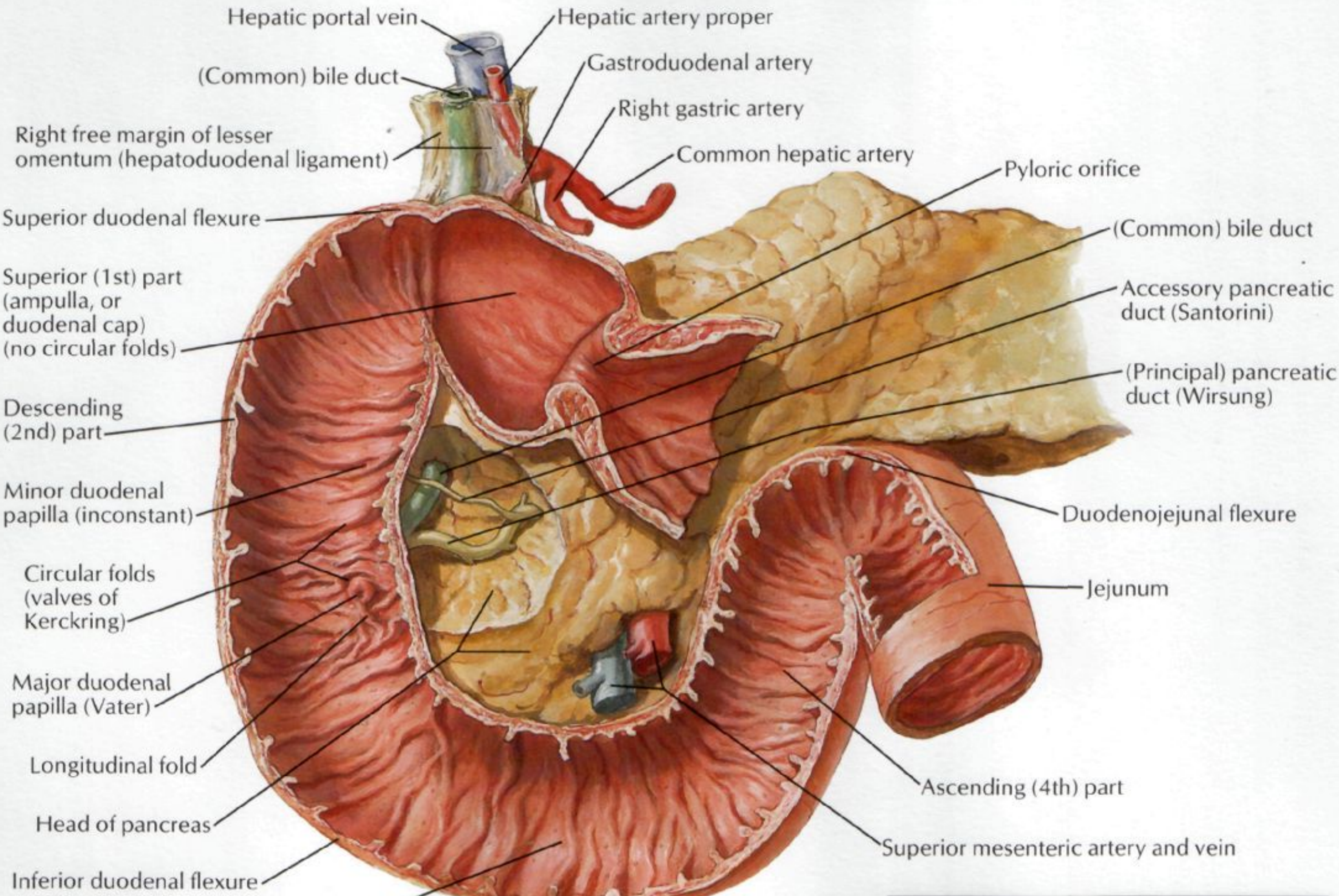
Musculature of Stomach

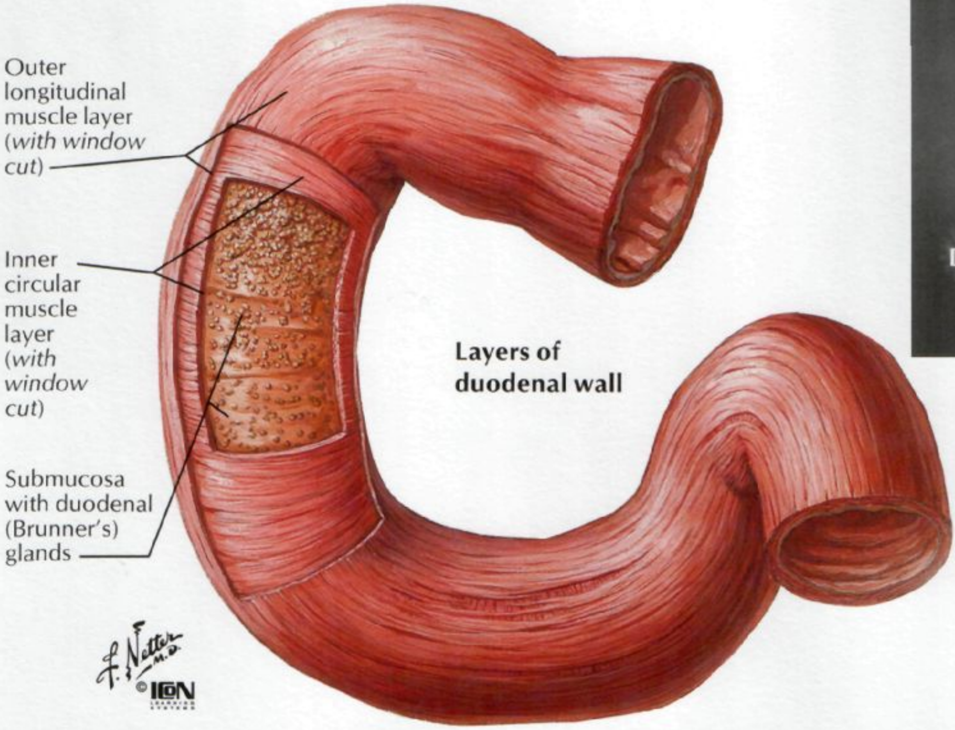

Longitudinal muscle of esophagus
Outer longitudinal muscle layer of stomach (concentrated chiefly at lesser and greater curvatures and at pyloric part)
Middle circular muscle layer of stomach
Longitudinal muscle of duodenum
Collar of Helvetius (middle circular and innermost oblique fibers blend here)
Outer longitudinal muscle layer (*cut away*)
Section through pylorus (composed chiefly of thickened circular muscle)
Middle circular muscle layer
Innermost oblique muscle layer
Circular muscle of duodenum
Longitudinal muscle of duodenum (*cut away*)
Windows cut in middle circular muscle layer

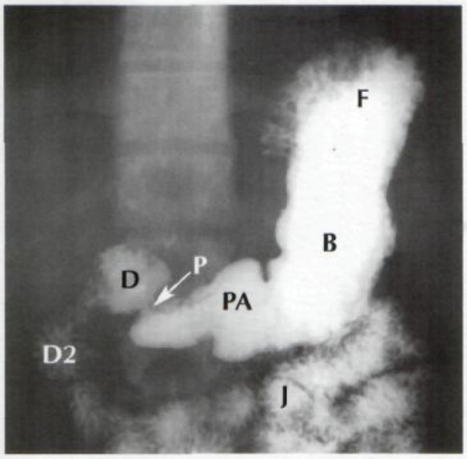
Duodenum In Situ



Mucosa and Musculature of Duodenum


Hepatic portal vein
Hepatic artery proper
(Common) bile duct
Gastroduodenal artery
Right gastric artery
Right free margin of lesser omentum (hepatoduodenal ligament)
Common hepatic artery
Pyloric orifice
Superior duodenal flexure
(Common) bile duct
Superior (1st) part (ampulla, or duodenal cap) (no circular folds)
Accessory pancreatic duct (Santorini)
(Principal) pancreatic duct (Wirsung)
Descending (2nd) part
Minor duodenal papilla (inconstant)
Duodenojejunal flexure
Circular folds (valves of Kerckring)
Jejunum
Major duodenal papilla (Vater)
Longitudinal fold
Ascending (4th) part
Head of pancreas
Superior mesenteric artery and vein
Inferior duodenal flexure
Inferior (horizontal, or 3rd) part

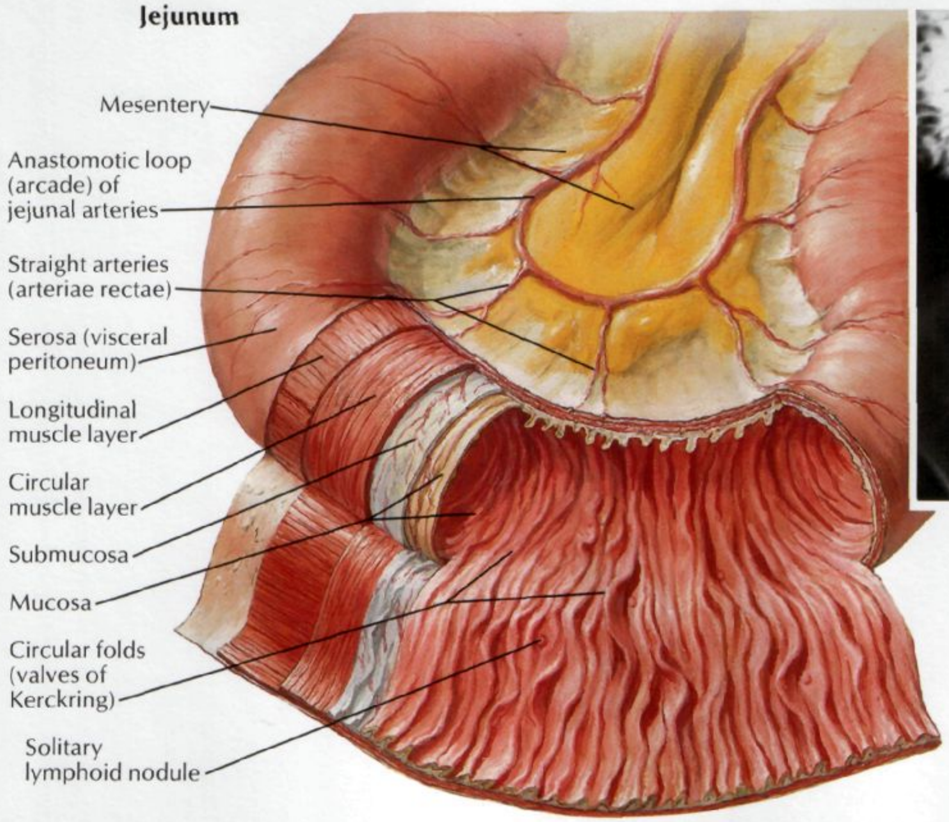

Outer longitudinal muscle layer (*with window cut*)
Inner circular muscle layer (*with window cut*)
Submucosa with duodenal (Brunner's) glands
Layers of duodenal wall

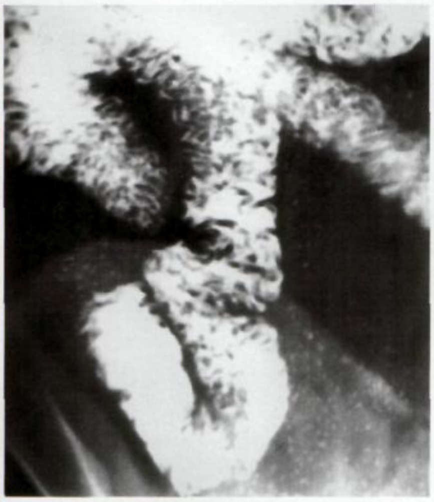


Barium radiograph of stomach, duodenum and proximal jejunum

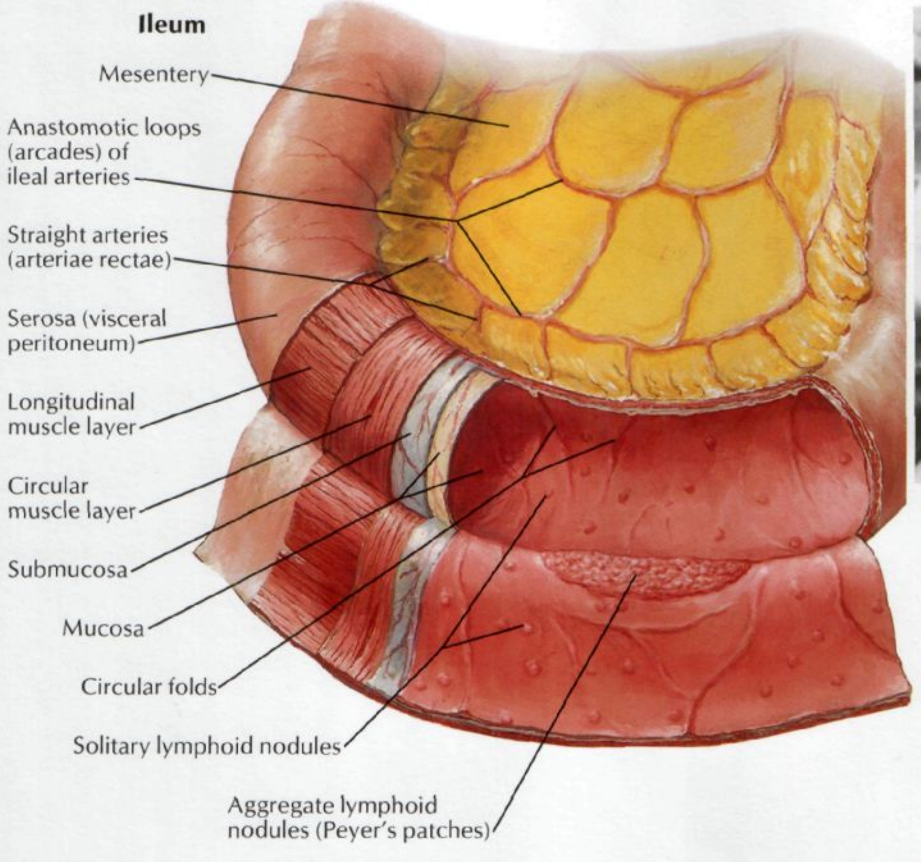
B	Body of stomach
D	Duodenal cap
D2	Descending (2nd) part of duodenum
F	Fundus of stomach
J	Proximal jejunum
P	Pylorus
PA	Pyloric antrum

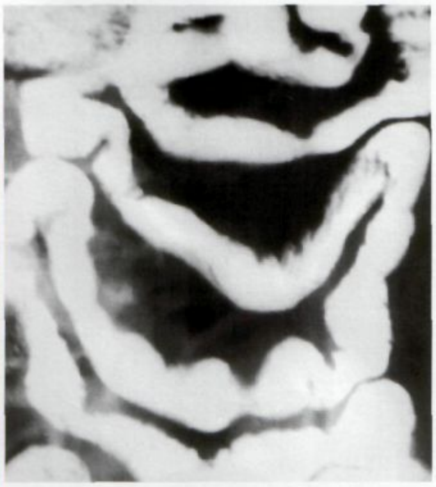
Mucosa and Musculature of Small Intestine


Jejunum
Mesentery
Anastomotic loop (arcade) of jejunal arteries
Straight arteries (arteriae rectae)
Serosa (visceral peritoneum)
Longitudinal muscle layer
Circular muscle layer
Submucosa
Mucosa
Circular folds (valves of Kerckring)
Solitary lymphoid nodule



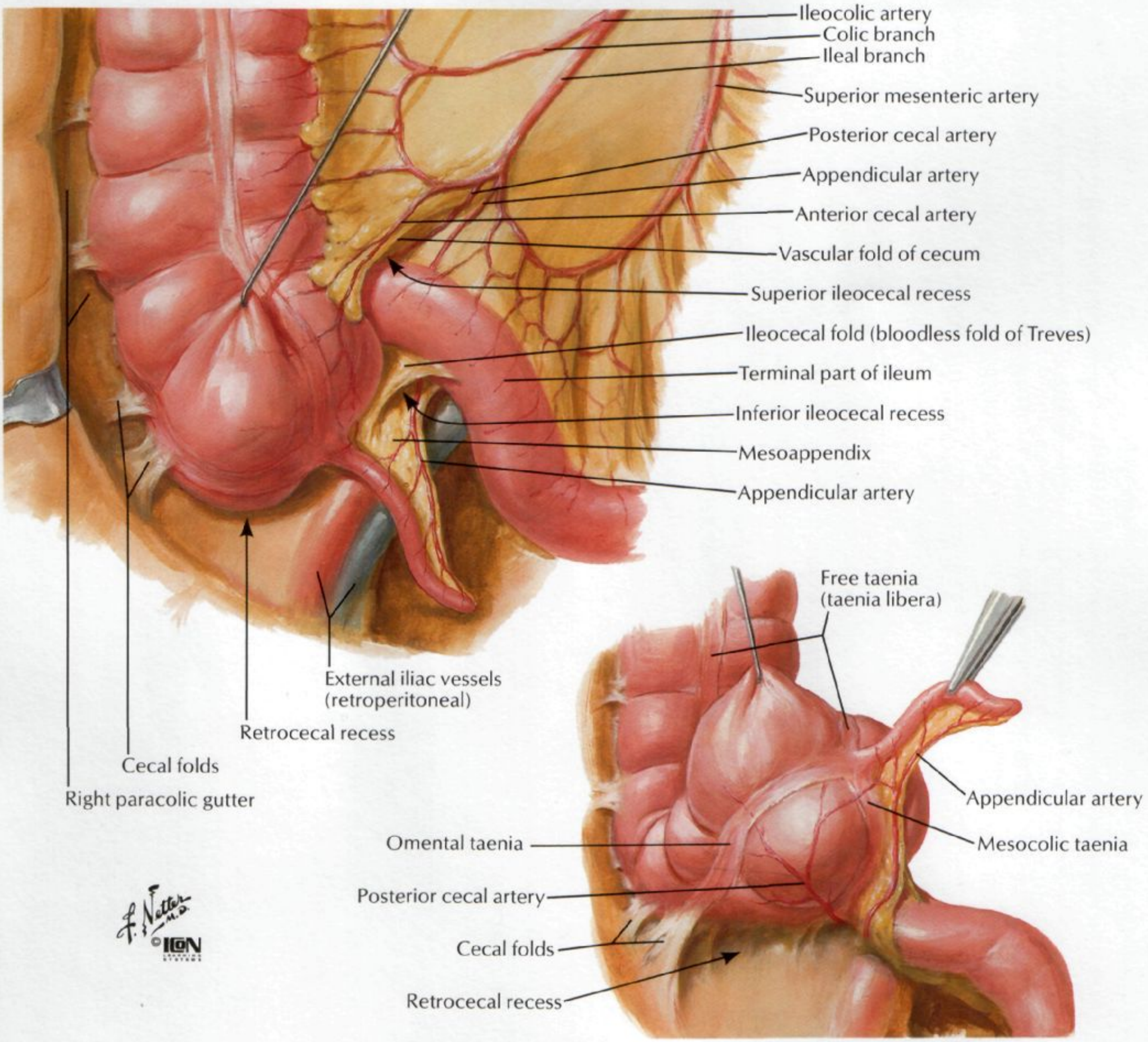
Barium radiograph of jejunum

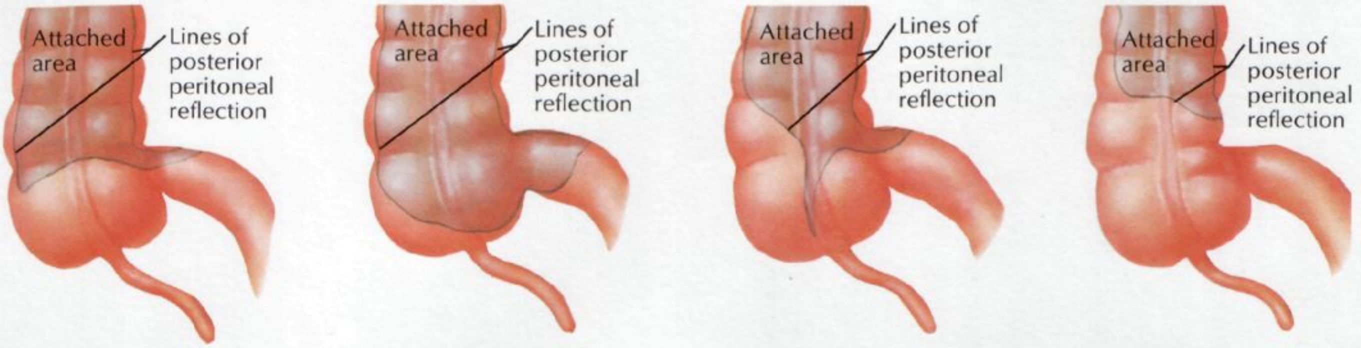

Ileum
Mesentery
Anastomotic loops (arcades) of ileal arteries
Straight arteries (arteriae rectae)
Serosa (visceral peritoneum)
Longitudinal muscle layer
Circular muscle layer
Submucosa
Mucosa
Circular folds
Solitary lymphoid nodules
Aggregate lymphoid nodules (Peyer's patches)



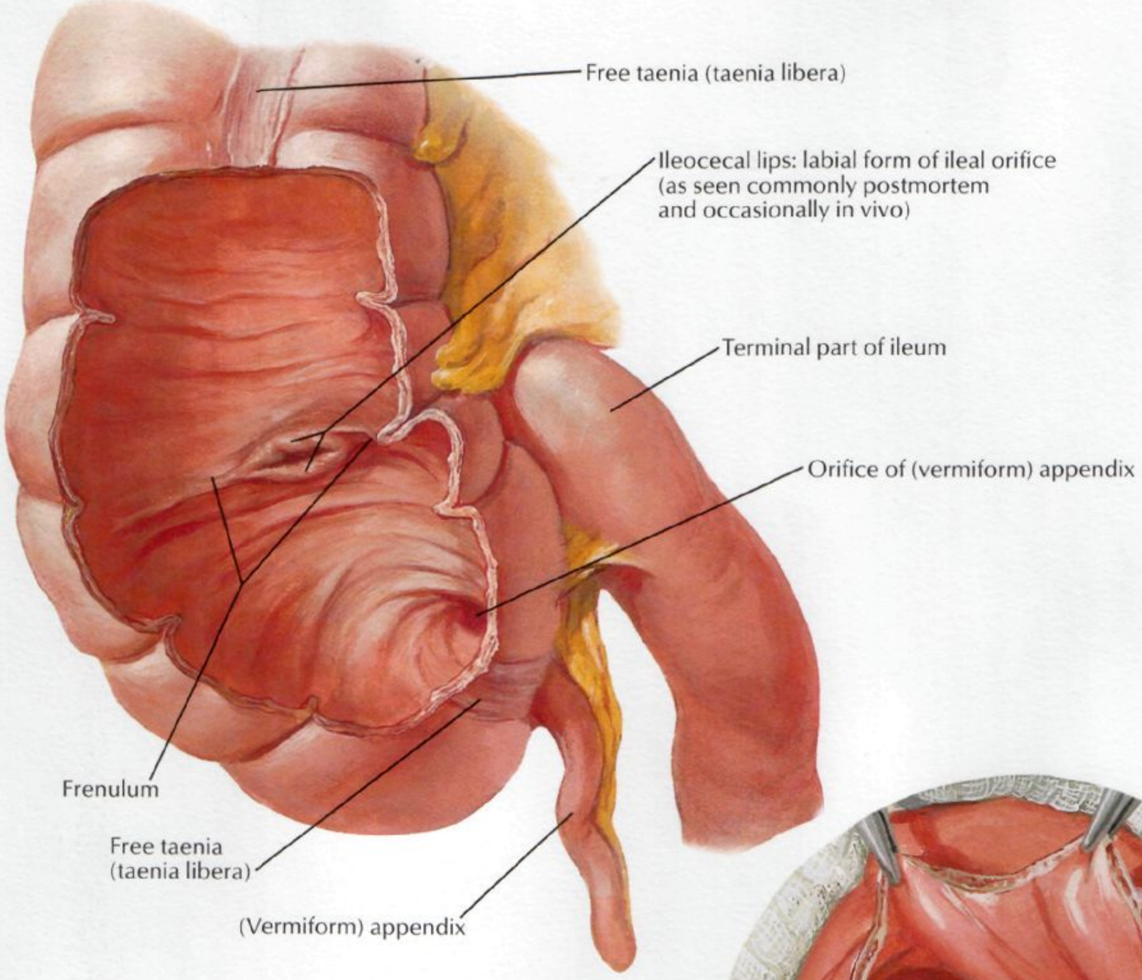
Barium radiograph of ileum

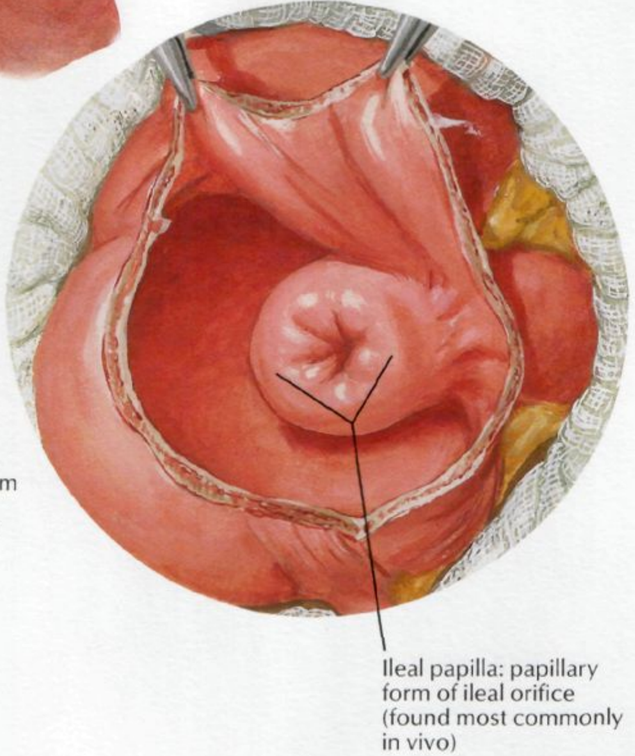
Ileocecal Region

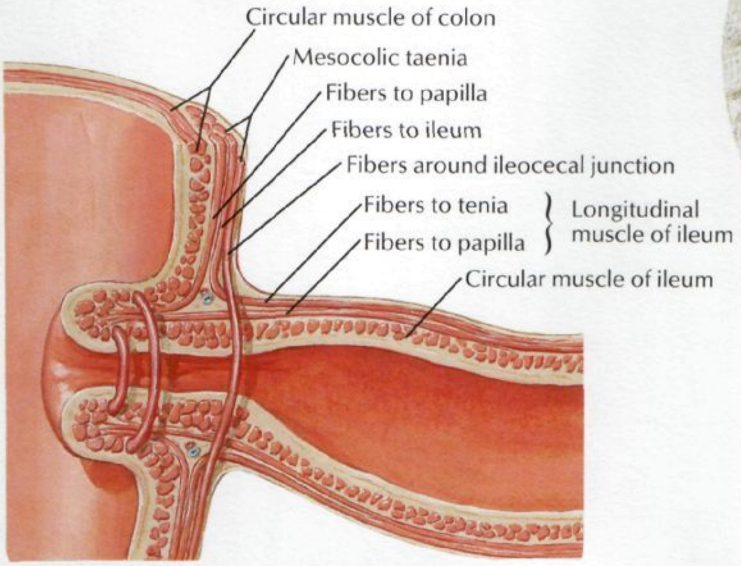



Some variations in posterior peritoneal attachment of cecum
Attached area
Lines of posterior peritoneal reflection
Attached area
Lines of posterior peritoneal reflection
Attached area
Lines of posterior peritoneal reflection
Attached area
Lines of posterior peritoneal reflection

Ileocecal Region (continued)


Free taenia (taenia libera)
Ileocecal lips: labial form of ileal orifice (as seen commonly postmortem and occasionally in vivo)
Terminal part of ileum
Orifice of (vermiform) appendix
Frenulum
Free taenia (taenia libera)
(Vermiform) appendix


Ileal papilla: papillary form of ileal orifice (found most commonly in vivo)



Schema of muscle fibers at ileal orifice

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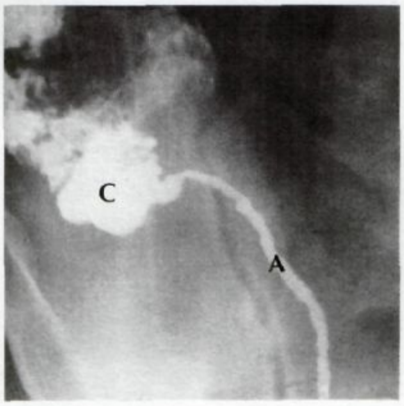
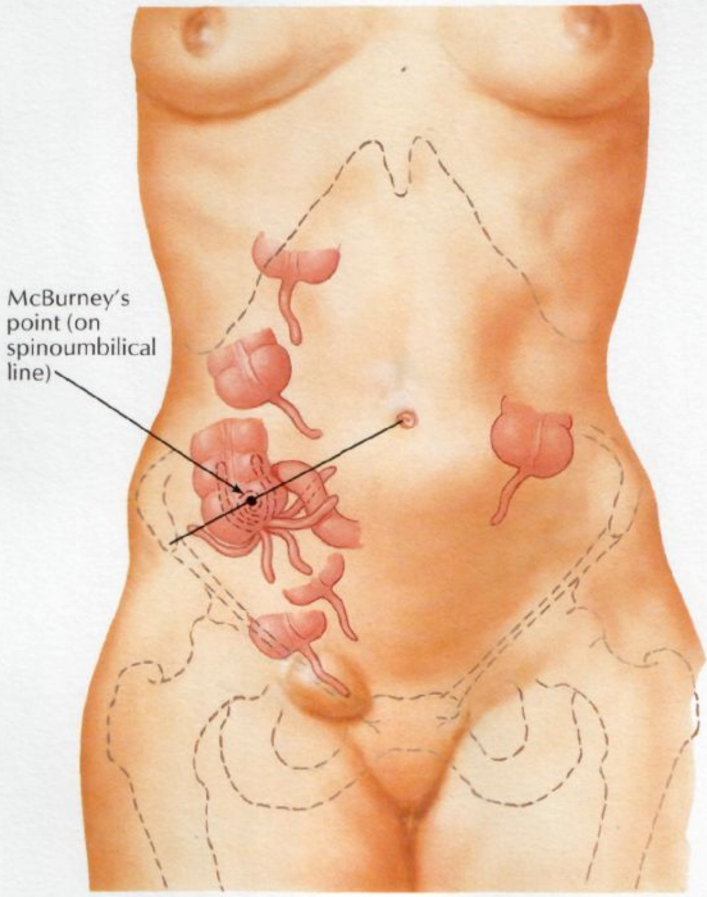
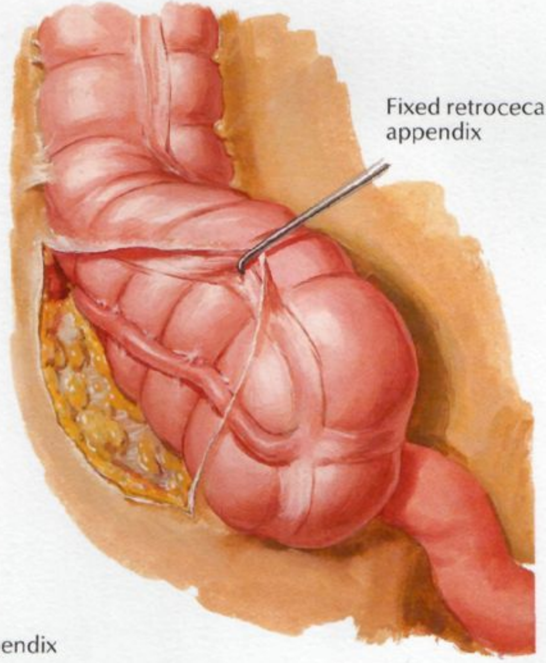
(Vermiform) Appendix

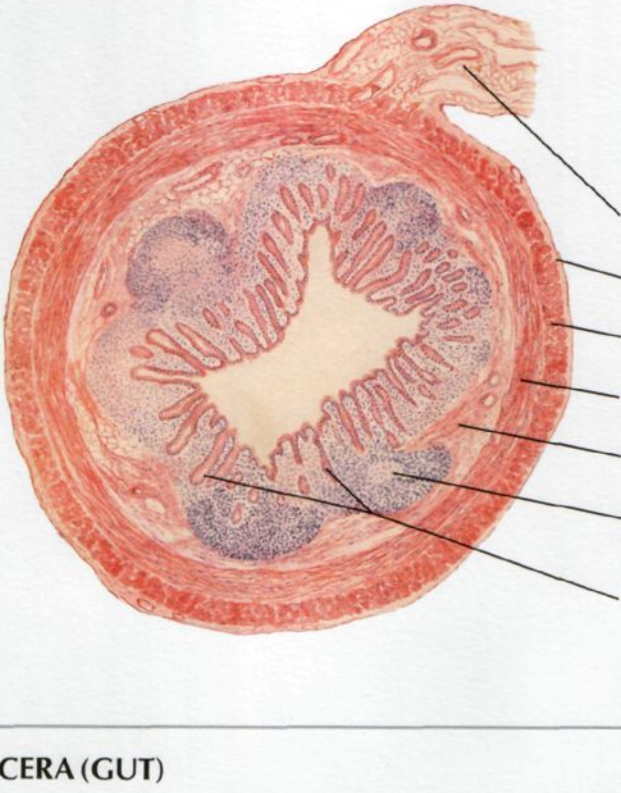


Barium radiograph of unusually long appendix (**A** Appendix; **C** Cecum)



Variations in position of appendix





F. Netter M.D.

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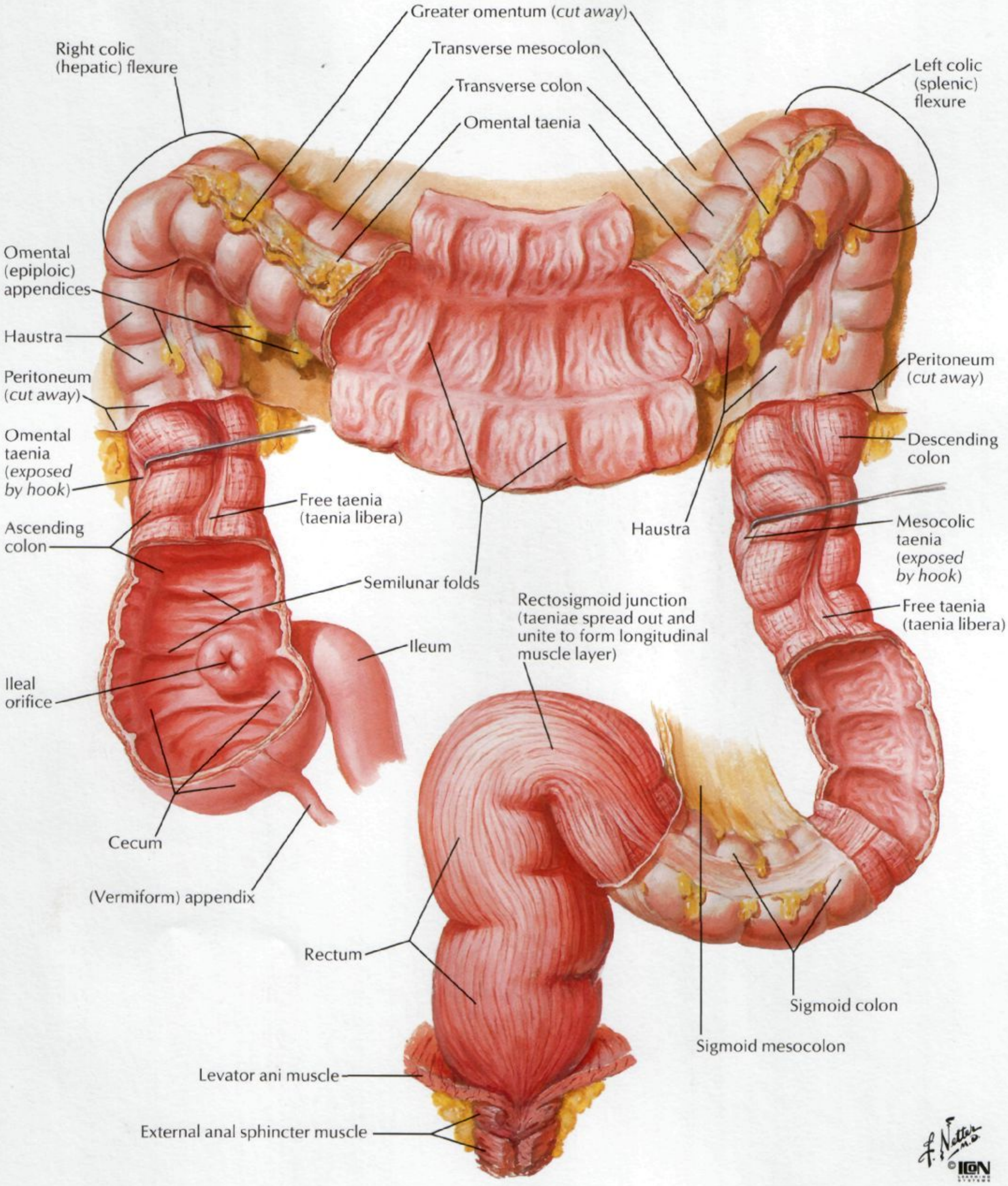
Mucosa and Musculature of Large Intestine

FOR RECTUM AND ANAL CANAL SEE PLATES 372–377


Greater omentum (*cut away*)
Right colic (hepatic) flexure
Transverse mesocolon
Transverse colon
Left colic (splenic) flexure
Omental taenia
Omental (epiploic) appendices
Haustra
Peritoneum (*cut away*)
Peritoneum (*cut away*)
Omental taenia (*exposed by hook*)
Descending colon
Free taenia (taenia libera)
Ascending colon
Haustra
Mesocolic taenia (*exposed by hook*)
Semilunar folds
Rectosigmoid junction (taeniae spread out and unite to form longitudinal muscle layer)
Free taenia (taenia libera)
Ileum
Ileal orifice
Cecum
(Vermiform) appendix
Rectum
Sigmoid colon
Sigmoid mesocolon
Levator ani muscle
External anal sphincter muscle
F. Netter M.D.
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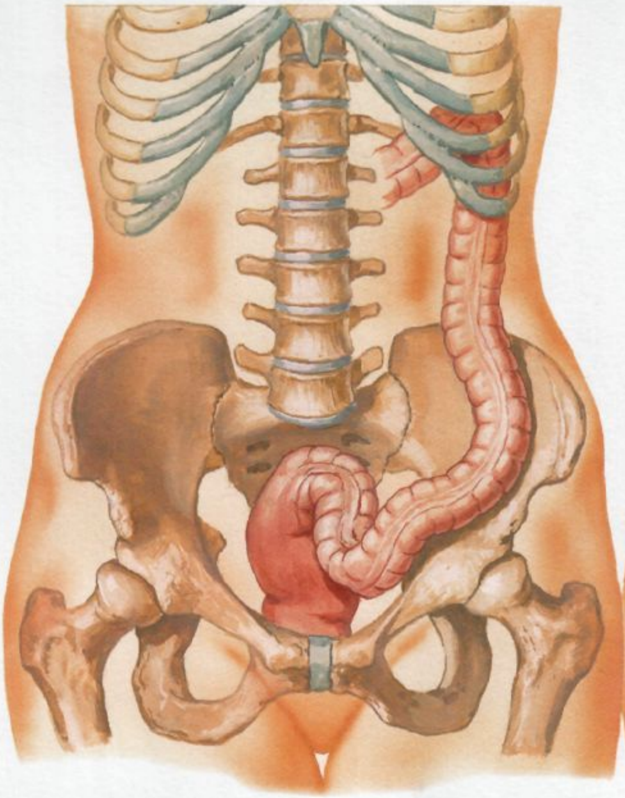
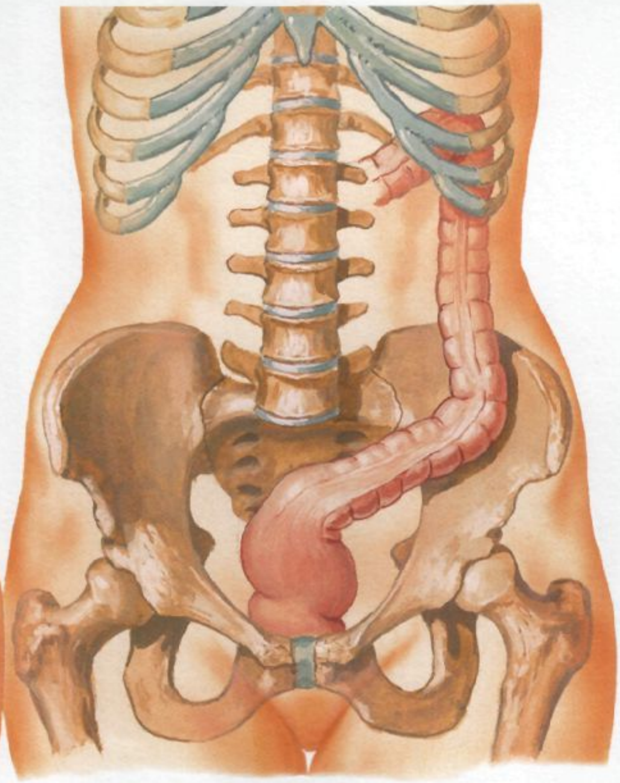
Sigmoid Colon: Variations in Position

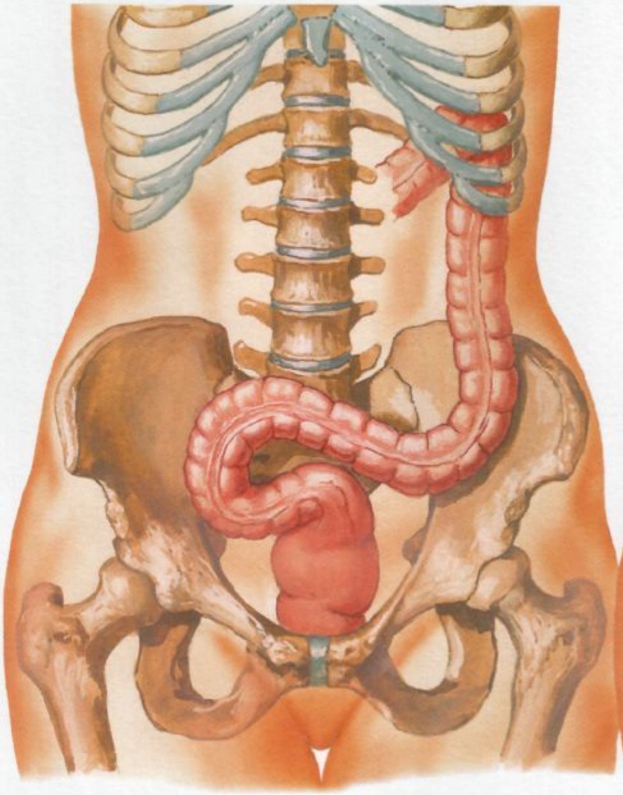
FOR RECTUM SEE PLATES 347, 348, 372–375



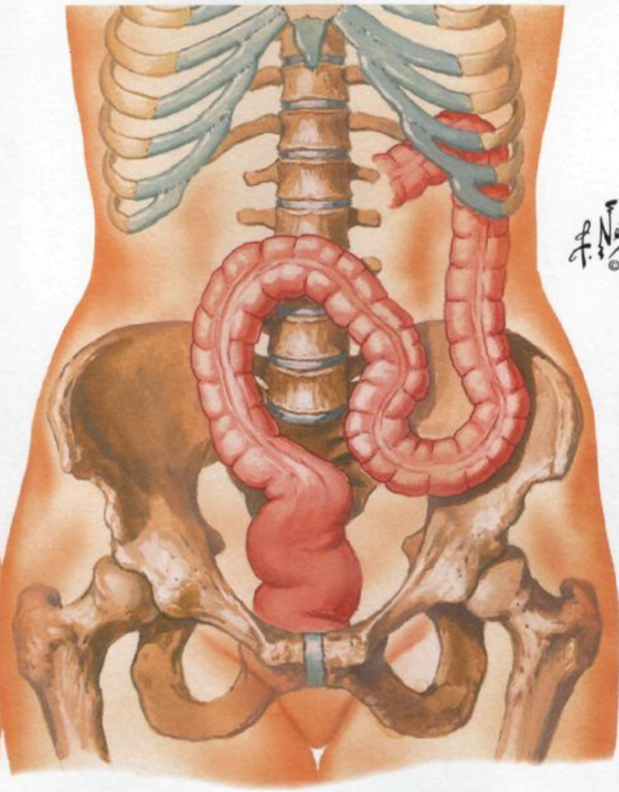
Typical



Short, straight, obliquely into pelvis



Looping to right side



Ascending high into abdomen

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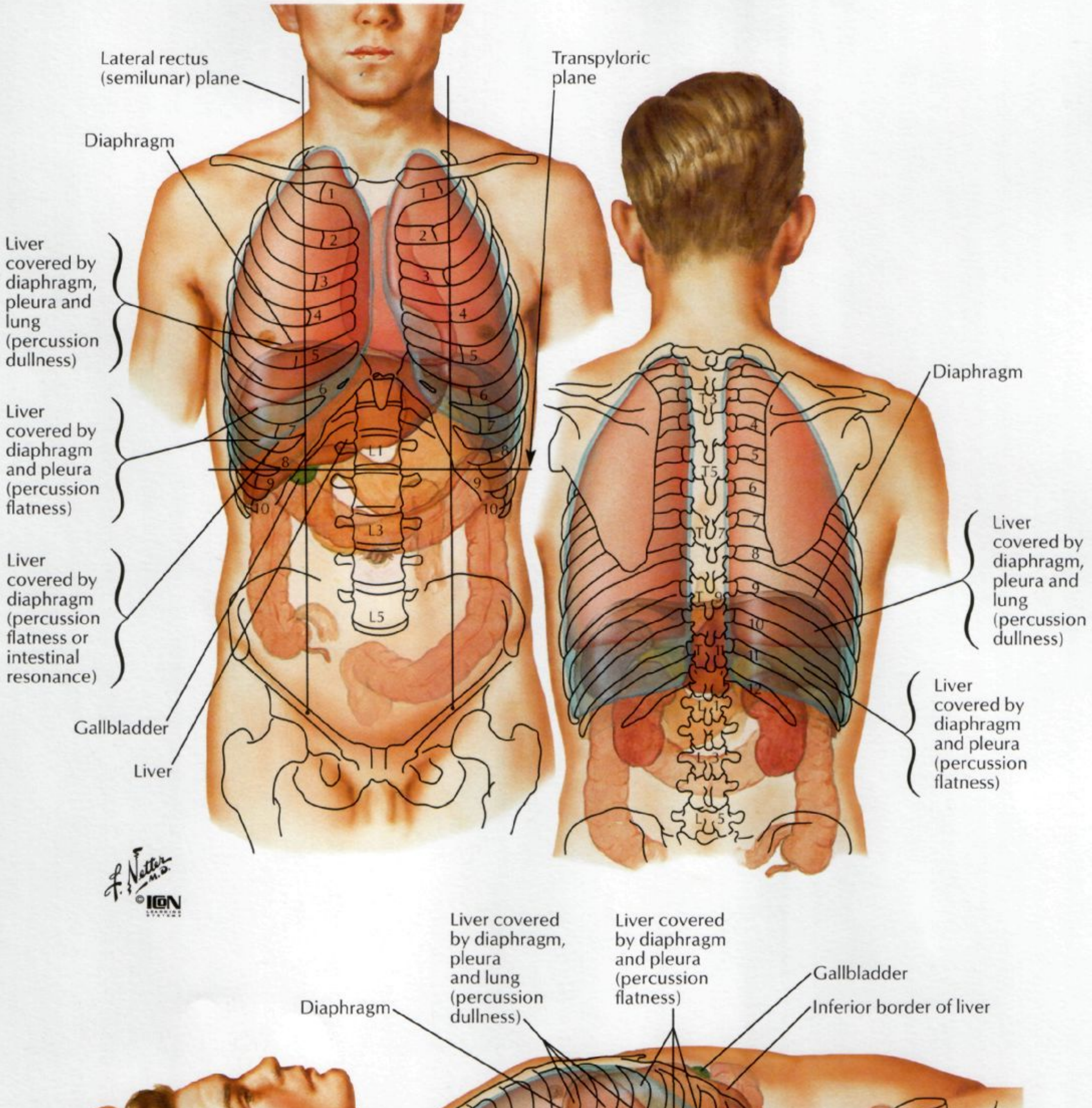
Topography of Liver



Lateral rectus (semilunar) plane
Transpyloric plane
Diaphragm
Liver covered by diaphragm, pleura and lung (percussion dullness)
Liver covered by diaphragm and pleura (percussion flatness)
Liver covered by diaphragm (percussion flatness or intestinal resonance)
Gallbladder
Liver
1
2
3
4
5
6
7
8
9
10
L1
L3
L5
Diaphragm
Liver covered by diaphragm, pleura and lung (percussion dullness)
Liver covered by diaphragm and pleura (percussion flatness)
T3
T5
T7
T9
T11
L1
L3
L5
4
5
6
7
8
9
10
11
12
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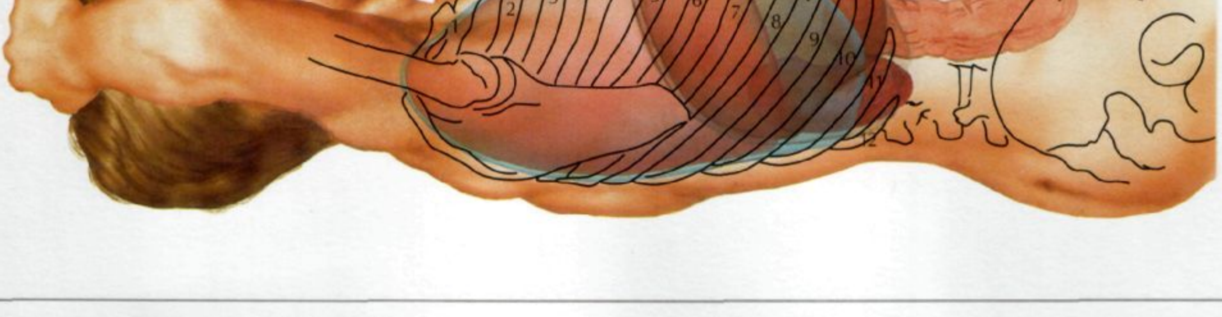
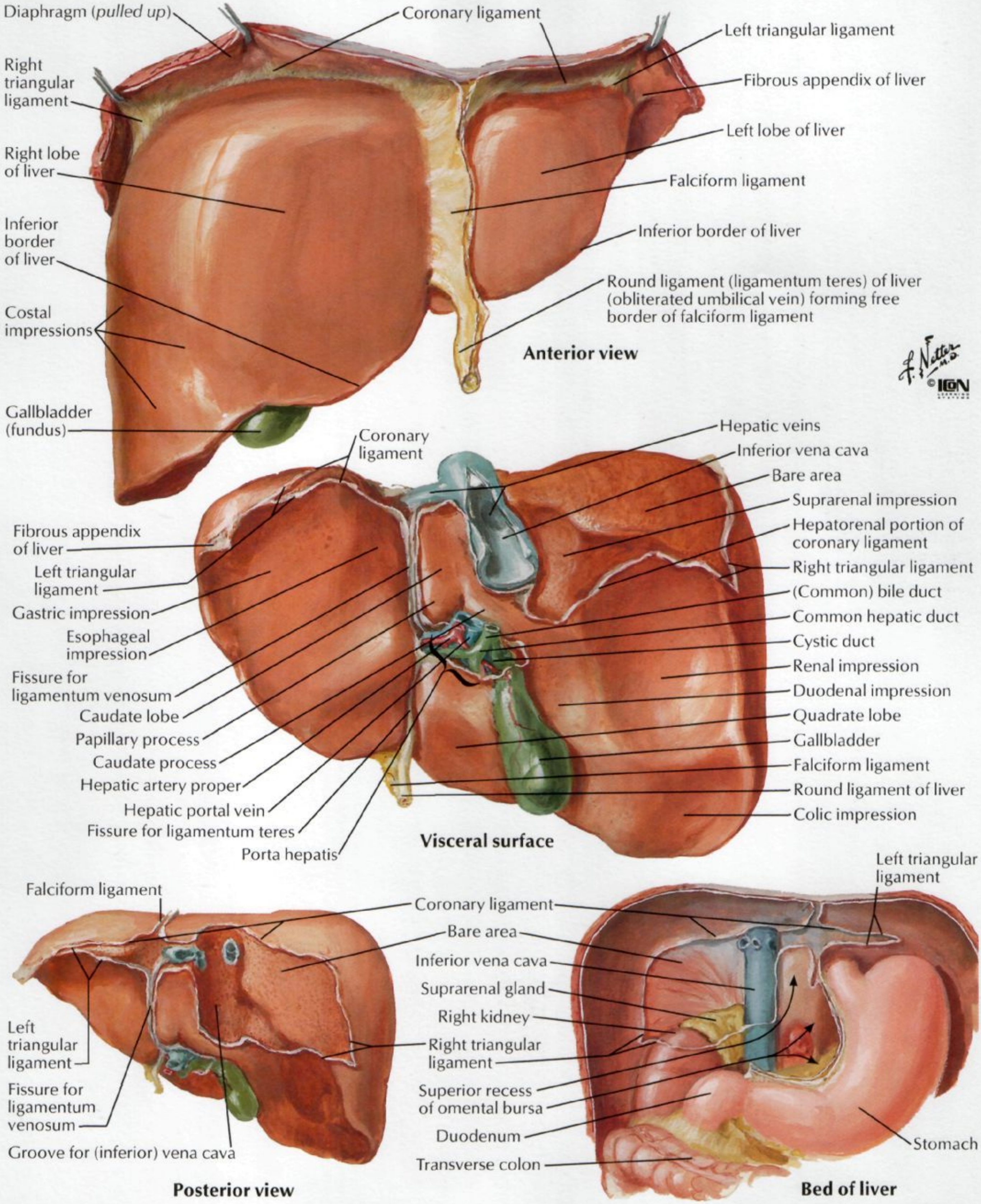
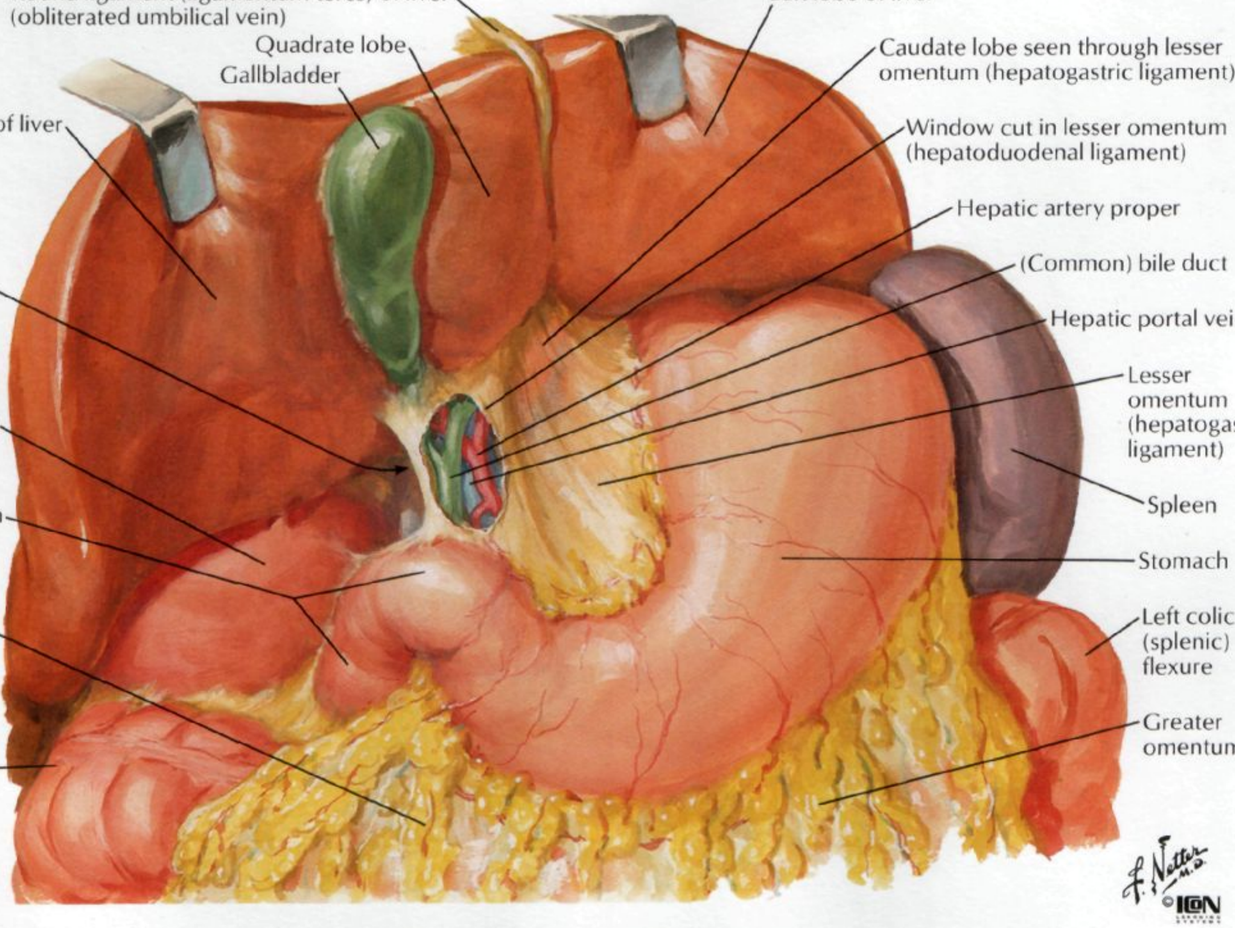


Diaphragm
Liver covered by diaphragm, pleura and lung (percussion dullness)
Liver covered by diaphragm and pleura (percussion flatness)
Gallbladder
Inferior border of liver
1
2
3
4
5
6
7
8
9
10
11
12

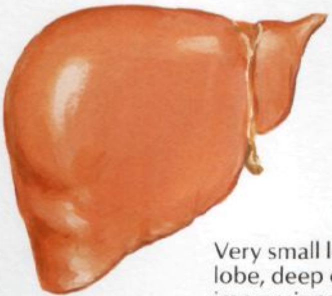
Surfaces and Bed of Liver



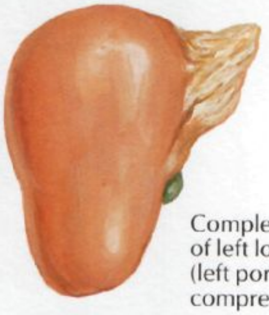
Liver In Situ and Variations in Form


Round ligament (ligamentum teres) of liver (obliterated umbilical vein)
Quadrate lobe
Gallbladder
Right lobe of liver
Omental (epiploic) foramen (Winslow)
Kidney (retroperitoneal)
Duodenum
Greater omentum
Right colic (hepatic) flexure
Left lobe of liver
Caudate lobe seen through lesser omentum (hepatogastric ligament)
Window cut in lesser omentum (hepatoduodenal ligament)
Hepatic artery proper
(Common) bile duct
Hepatic portal vein
Lesser omentum (hepatogastric ligament)
Spleen
Stomach
Left colic (splenic) flexure
Greater omentum

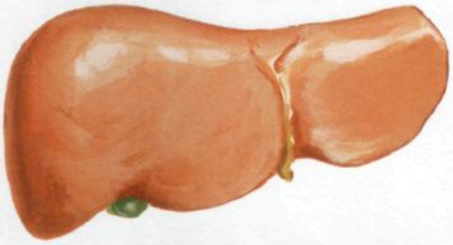
Variations in form of liver



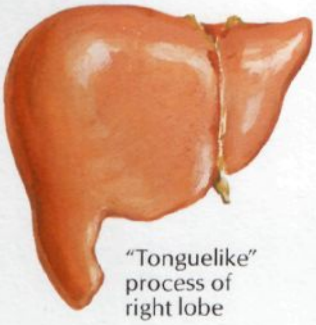
Very small left lobe, deep costal impressions



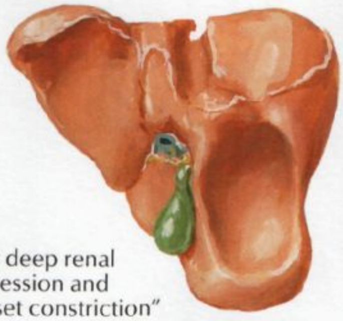
Complete atrophy of left lobe (left portal vein compression)



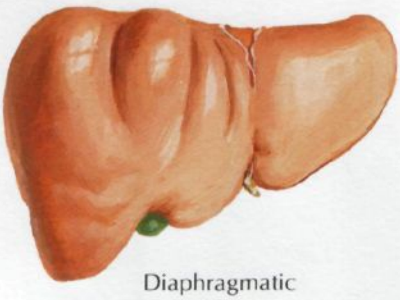
Transverse, "saddlelike" liver, relatively large left lobe



"Tonguelike" process of right lobe

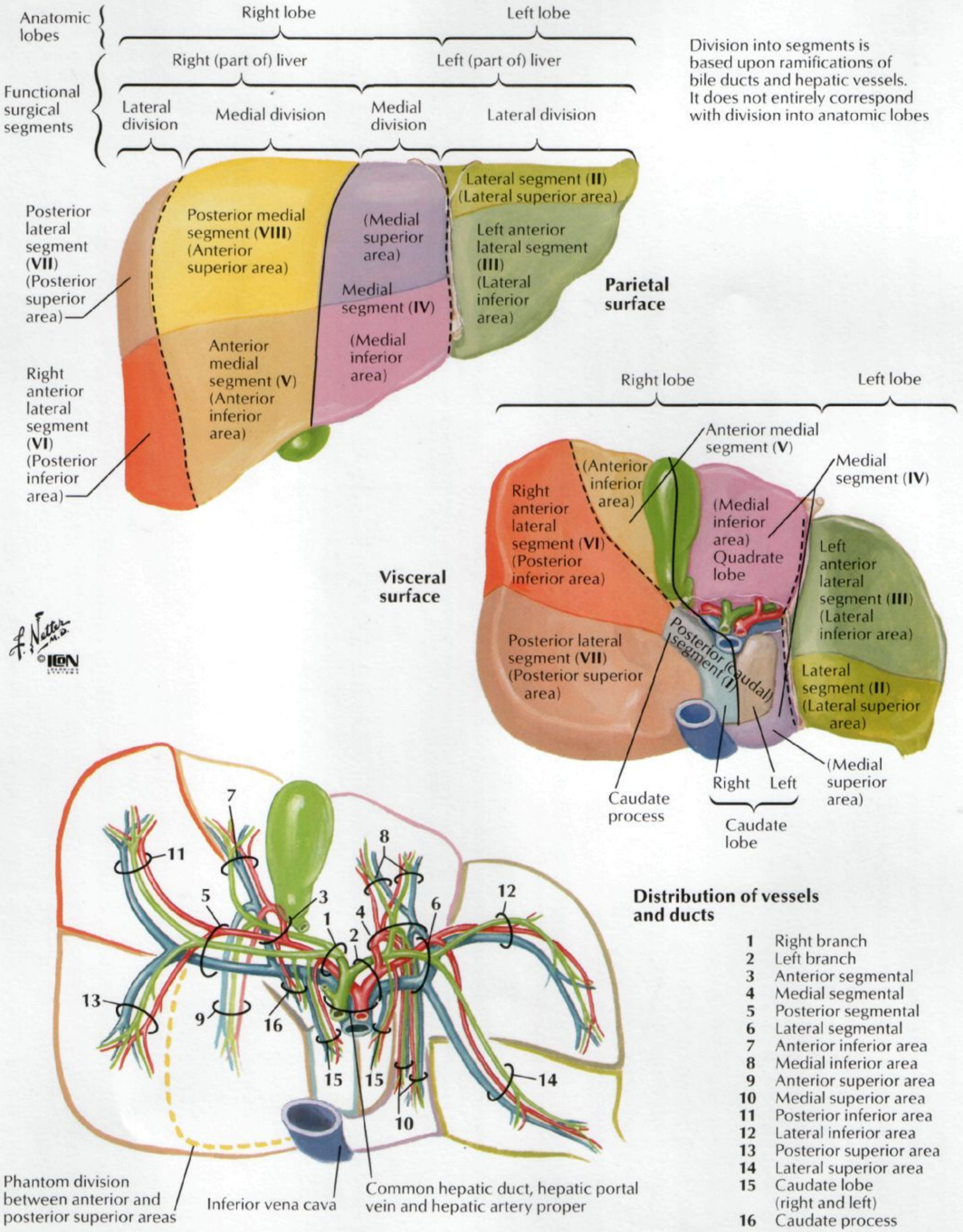


Very deep renal impression and "corset constriction"



Diaphragmatic grooves

Liver Segments and Lobes: Vessel and Duct Distribution


Anatomic lobes
Right lobe
Left lobe
Functional surgical segments
Right (part of) liver
Left (part of) liver
Lateral division
Medial division
Medial division
Lateral division
Posterior lateral segment (**VII**) (Posterior superior area)
Right anterior lateral segment (**VI**) (Posterior inferior area)
Posterior medial segment (**VIII**) (Anterior superior area)
Anterior medial segment (**V**) (Anterior inferior area)
(Medial superior area)
Medial segment (**IV**)
(Medial inferior area)
Lateral segment (**II**) (Lateral superior area)
Left anterior lateral segment (**III**) (Lateral inferior area)
Right lobe
Left lobe
Anterior medial segment (**V**)
Medial segment (**IV**)
(Anterior inferior area)
Right anterior lateral segment (**VI**) (Posterior inferior area)
(Medial inferior area) Quadrate lobe
Left anterior lateral segment (**III**) (Lateral inferior area)
Posterior lateral segment (**VII**) (Posterior superior area)
Posterior (caudal) segment (**I**)
Lateral segment (**II**) (Lateral superior area)
(Medial superior area)
Right
Left
Caudate lobe
Caudate process
7
8
11
12
5
3
1
4
6
2
13
9
16
15
15
14
10
Phantom division between anterior and posterior superior areas
Inferior vena cava
Common hepatic duct, hepatic portal vein and hepatic artery proper

Division into segments is based upon ramifications of bile ducts and hepatic vessels. It does not entirely correspond with division into anatomic lobes

Parietal surface

Visceral surface

Distribution of vessels and ducts

1	Right branch
2	Left branch
3	Anterior segmental
4	Medial segmental
5	Posterior segmental
6	Lateral segmental
7	Anterior inferior area
8	Medial inferior area
9	Anterior superior area
10	Medial superior area
11	Posterior inferior area
12	Lateral inferior area
13	Posterior superior area
14	Lateral superior area
15	Caudate lobe (right and left)
16	Caudate process

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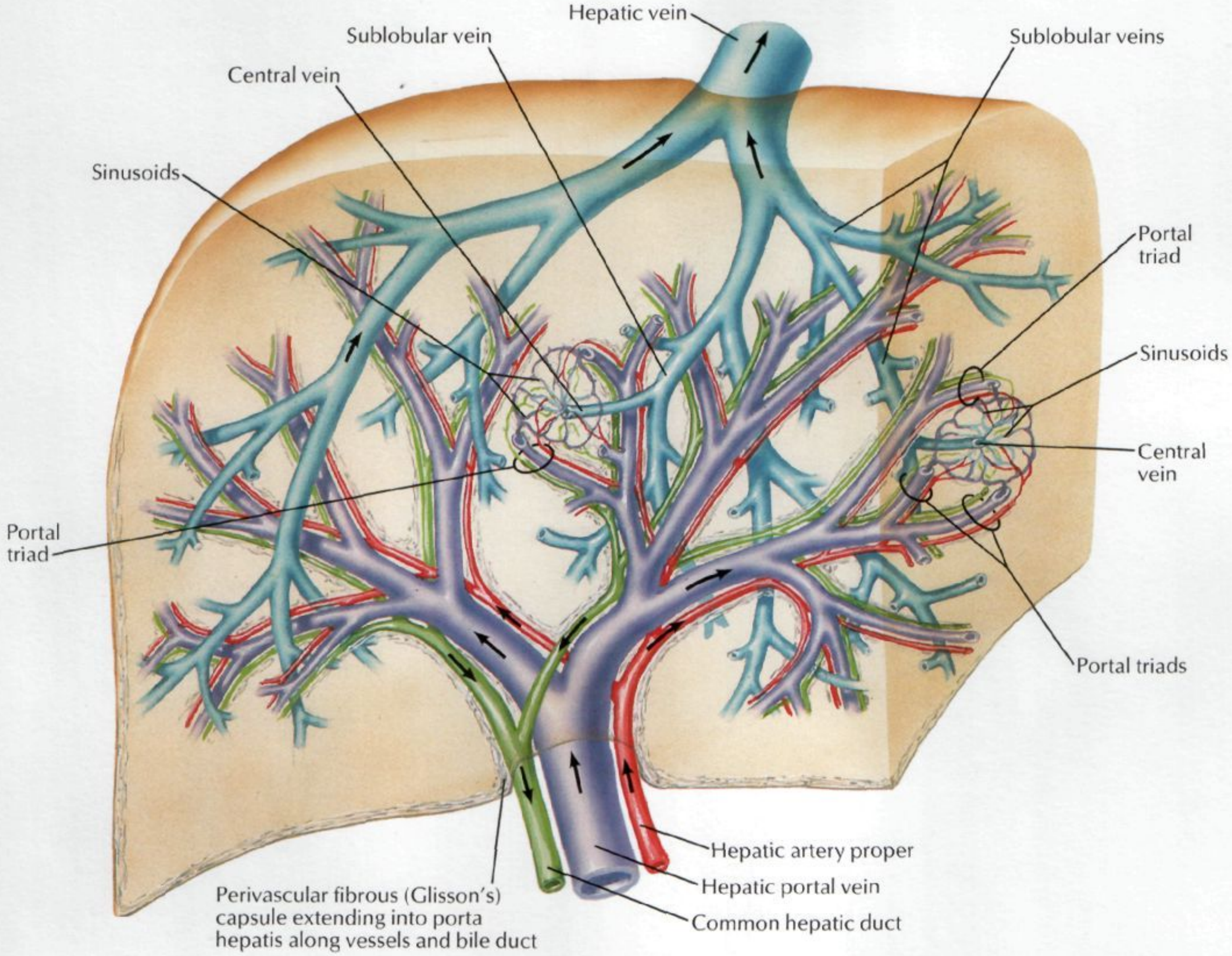
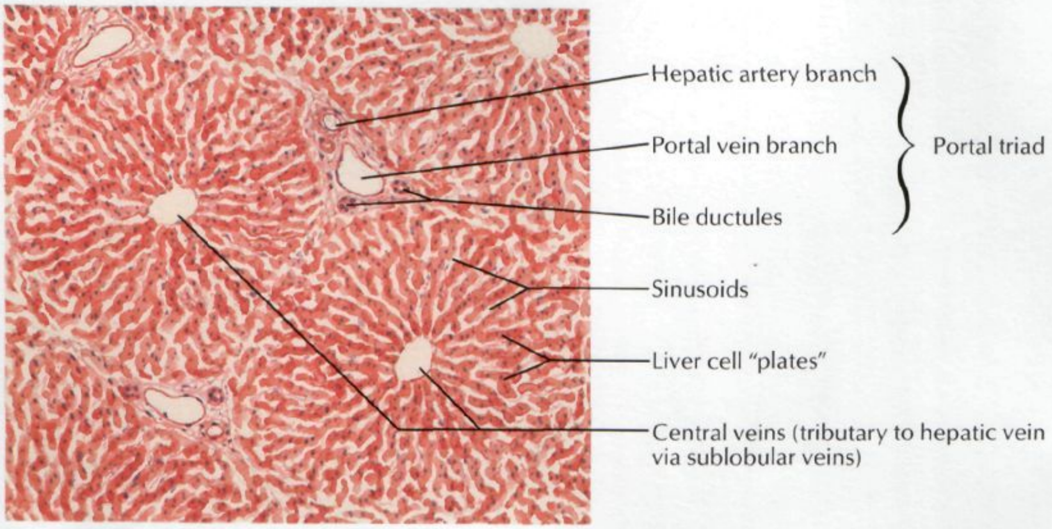
Intrahepatic Vascular and Duct Systems





Normal lobular pattern of liver

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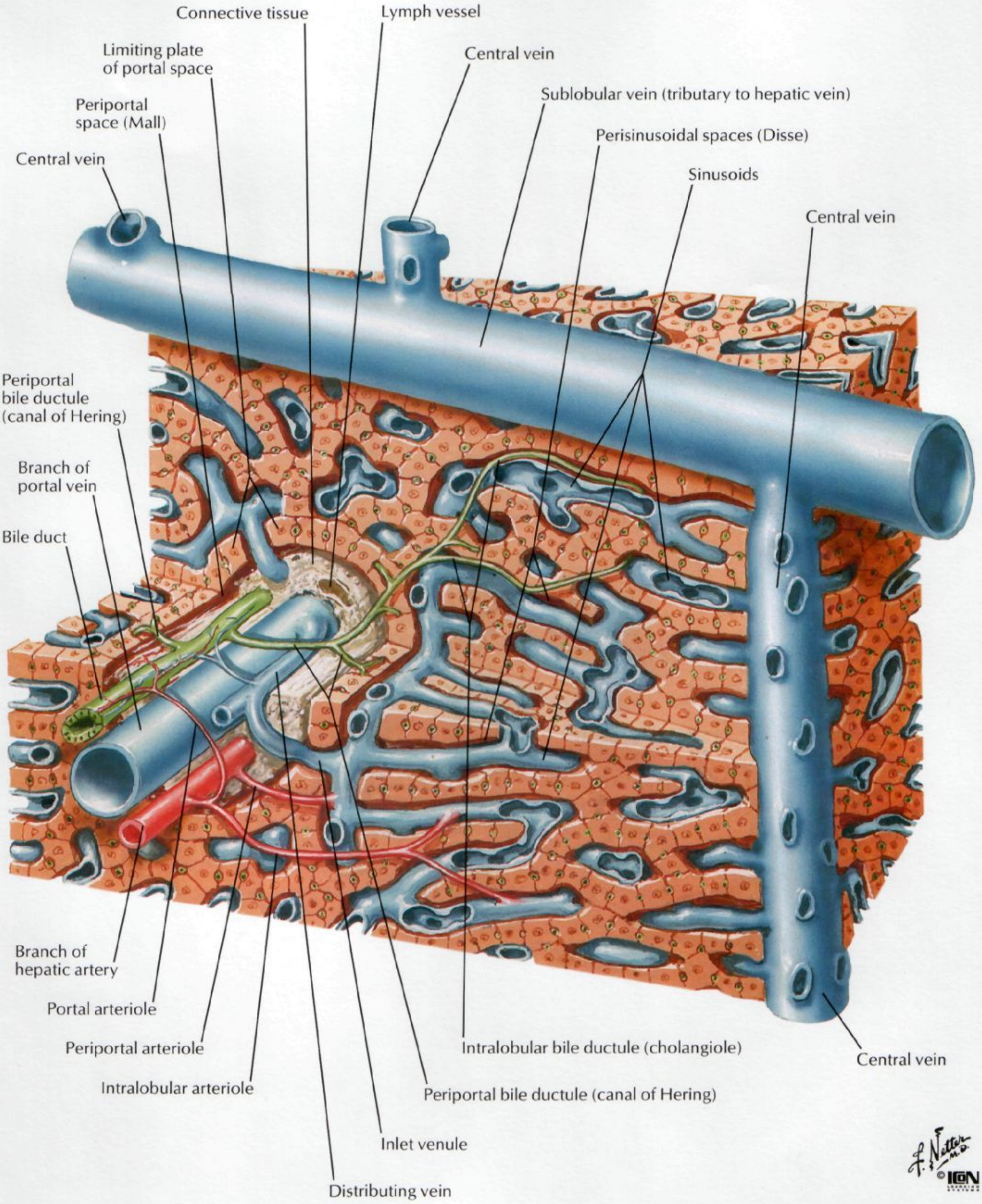
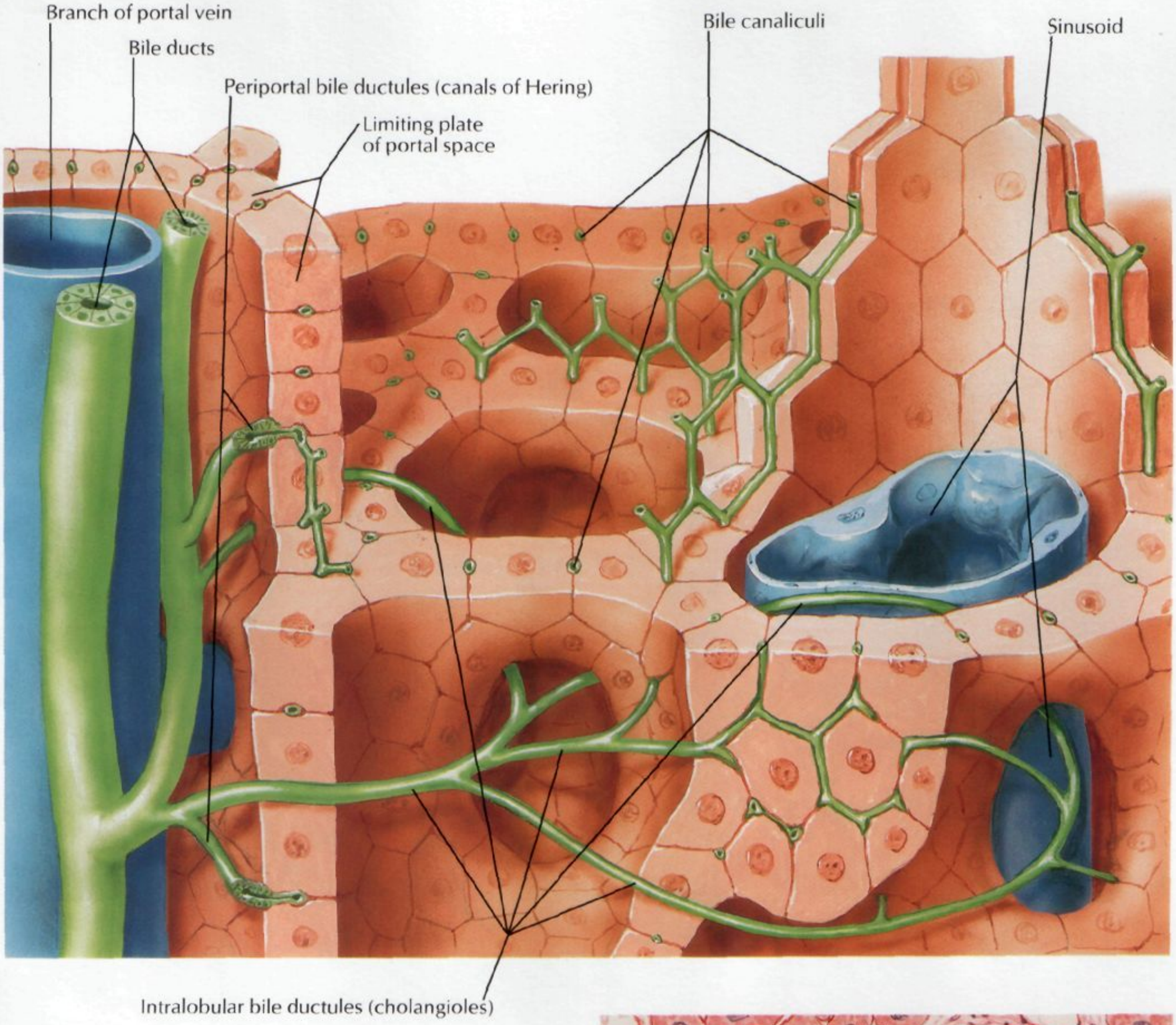
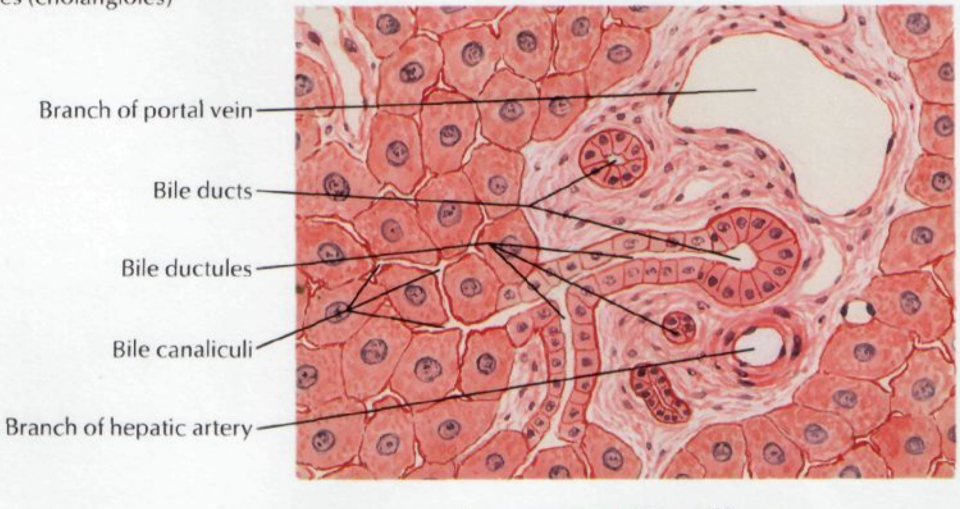
Liver Structure: Schema



Intrahepatic Biliary System: Schema

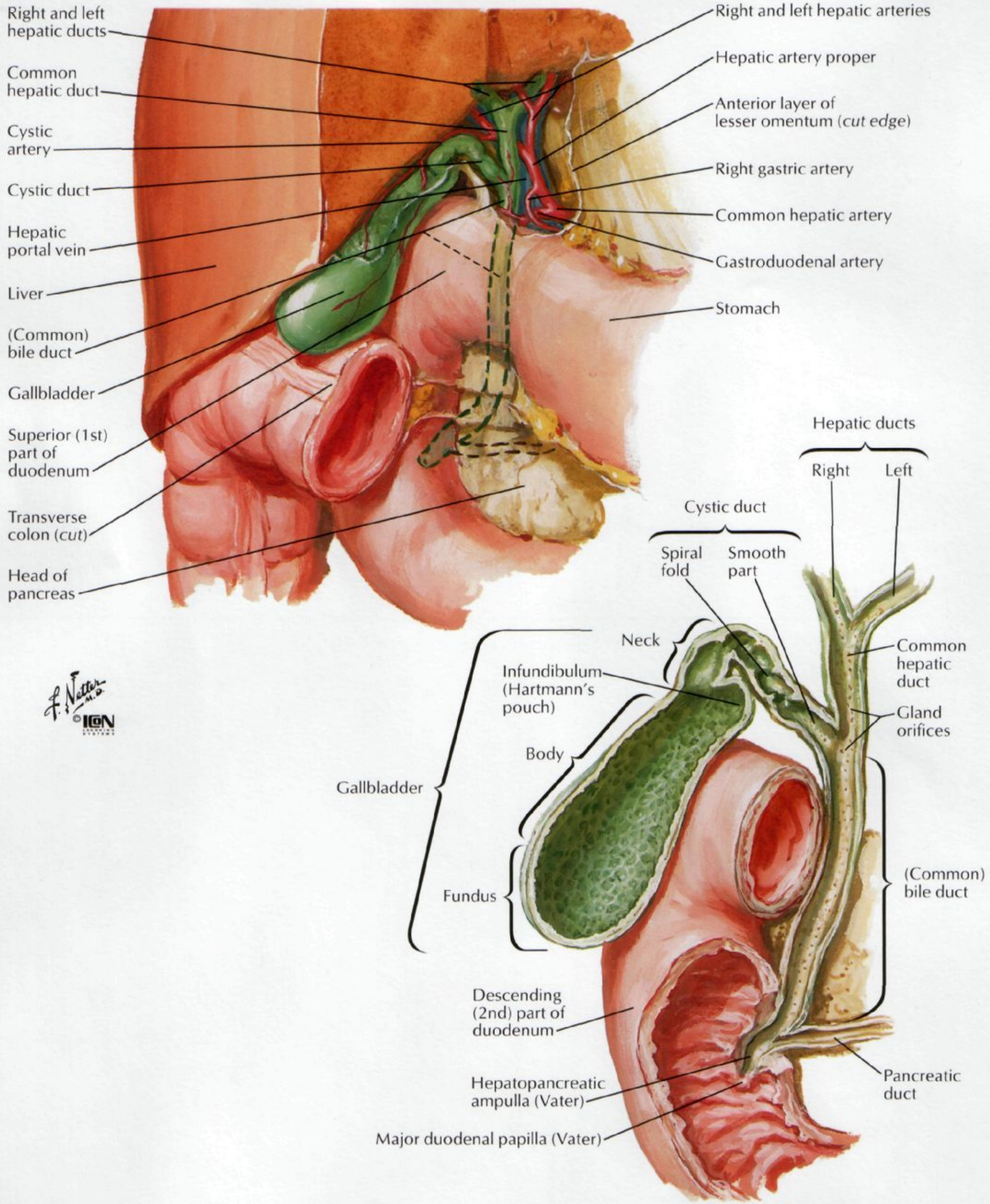

Branch of portal vein
Bile ducts
Periportal bile ductules (canals of Hering)
Limiting plate of portal space
Bile canaliculi
Sinusoid
Intralobular bile ductules (cholangioles)

Note: In above illustration, bile canaliculi appear as structures with walls of their own. However, as shown in histologic section at right, boundaries of canaliculi are actually a specialization of surface membranes of adjoining liver parenchymal cells



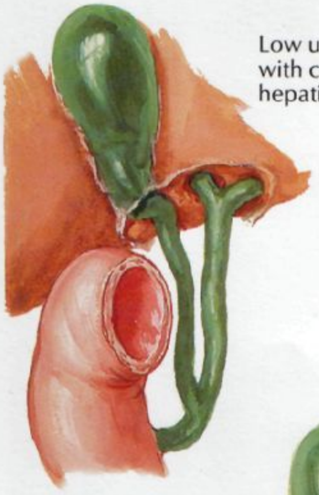
Low-power section of liver

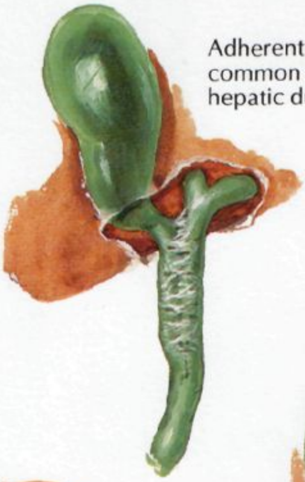
Gallbladder and Extrahepatic Bile Ducts

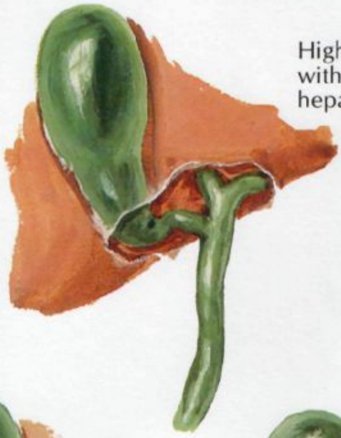


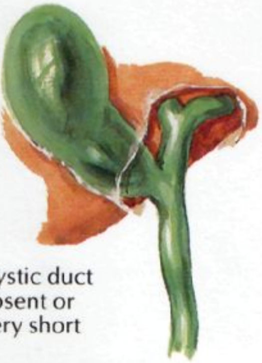
Variations in Cystic and Hepatic Ducts

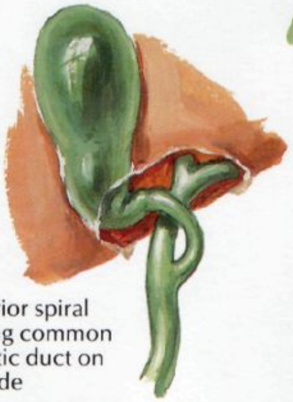
Variations in cystic duct

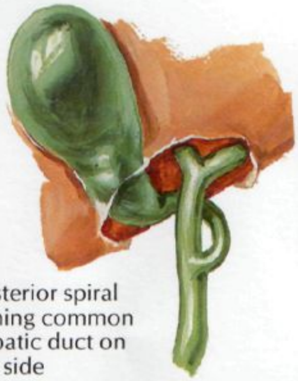

Low union with common hepatic duct


Adherent to common hepatic duct

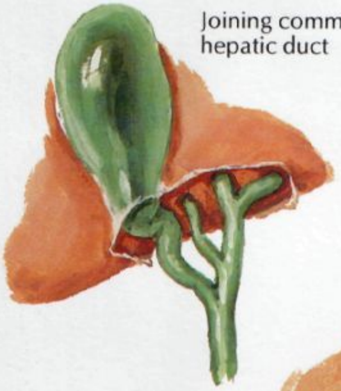

High union with common hepatic duct

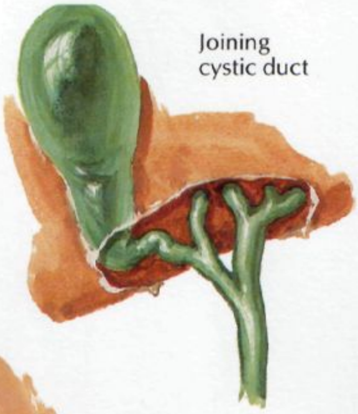

Cystic duct absent or very short

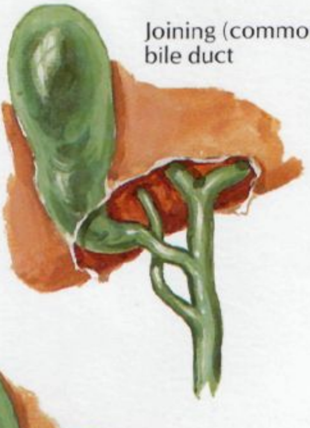

Anterior spiral joining common hepatic duct on left side

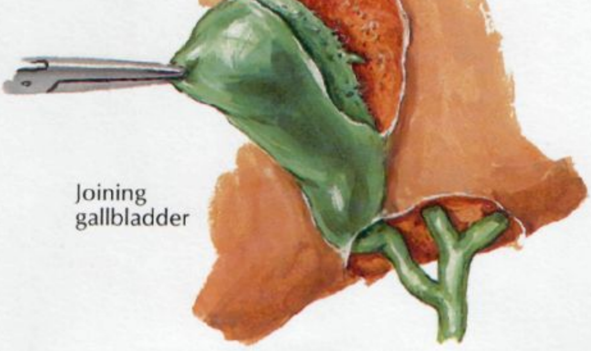

Posterior spiral joining common hepatic duct on left side

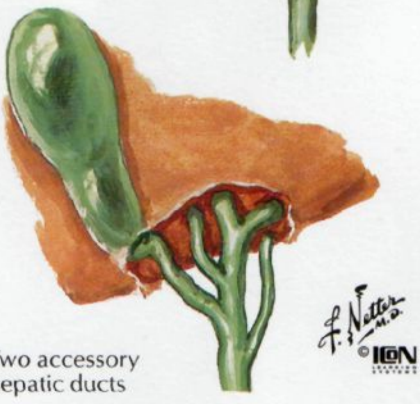
Accessory (aberrant) hepatic ducts


Joining common hepatic duct

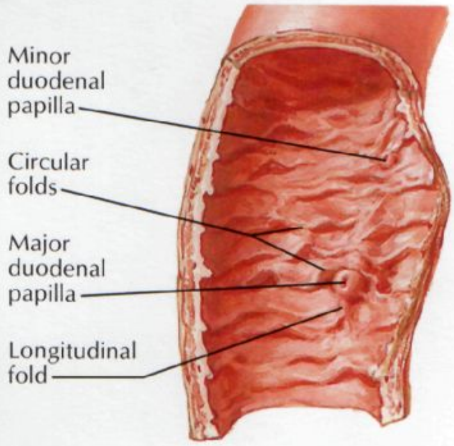

Joining cystic duct


Joining (common) bile duct

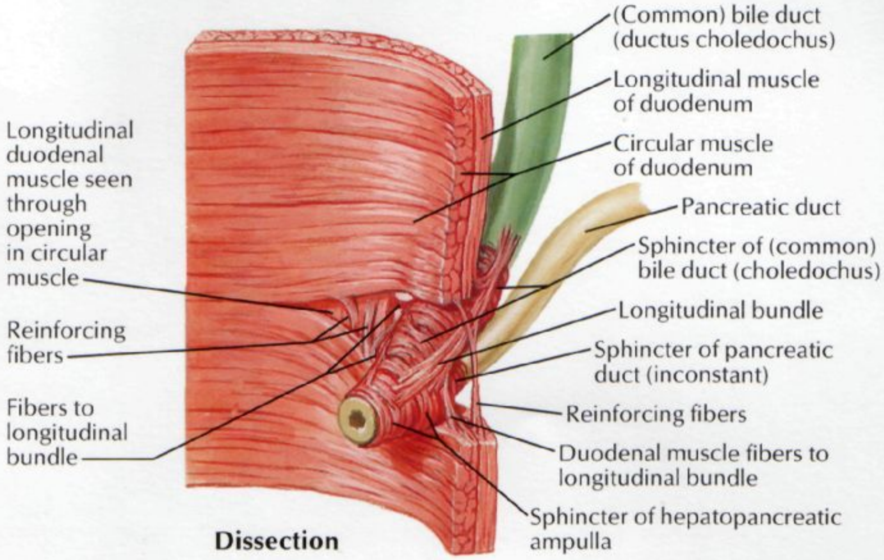

Joining gallbladder


Two accessory hepatic ducts

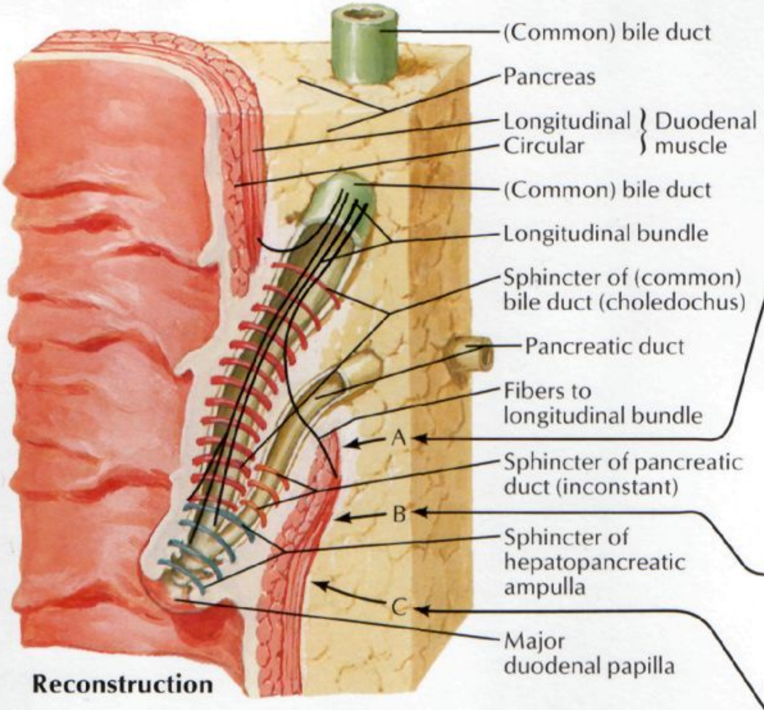
Junction of (Common) Bile Duct and Duodenum



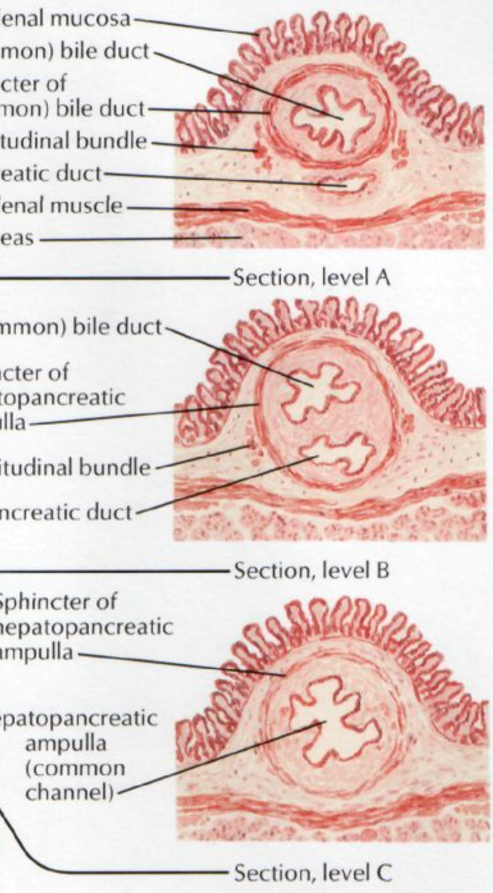
Interior of descending (2nd) part of duodenum


Longitudinal duodenal muscle seen through opening in circular muscle
Reinforcing fibers
Fibers to longitudinal bundle
(Common) bile duct (ductus choledochus)
Longitudinal muscle of duodenum
Circular muscle of duodenum
Pancreatic duct
Sphincter of (common) bile duct (choledochus)
Longitudinal bundle
Sphincter of pancreatic duct (inconstant)
Reinforcing fibers
Duodenal muscle fibers to longitudinal bundle
Sphincter of hepatopancreatic ampulla

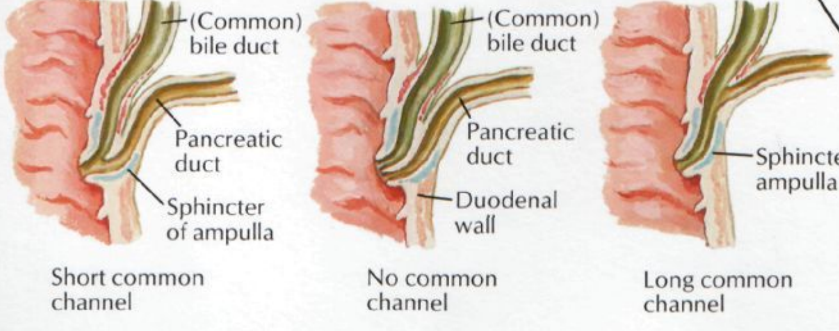
Dissection


(Common) bile duct
Pancreas
Longitudinal
Circular
Duodenal muscle
(Common) bile duct
Longitudinal bundle
Sphincter of (common) bile duct (choledochus)
Pancreatic duct
Fibers to longitudinal bundle
A
Sphincter of pancreatic duct (inconstant)
B
Sphincter of hepatopancreatic ampulla
C
Major duodenal papilla

Reconstruction



Variations in union of bile and pancreatic ducts



Short common channel

No common channel

Long common channel

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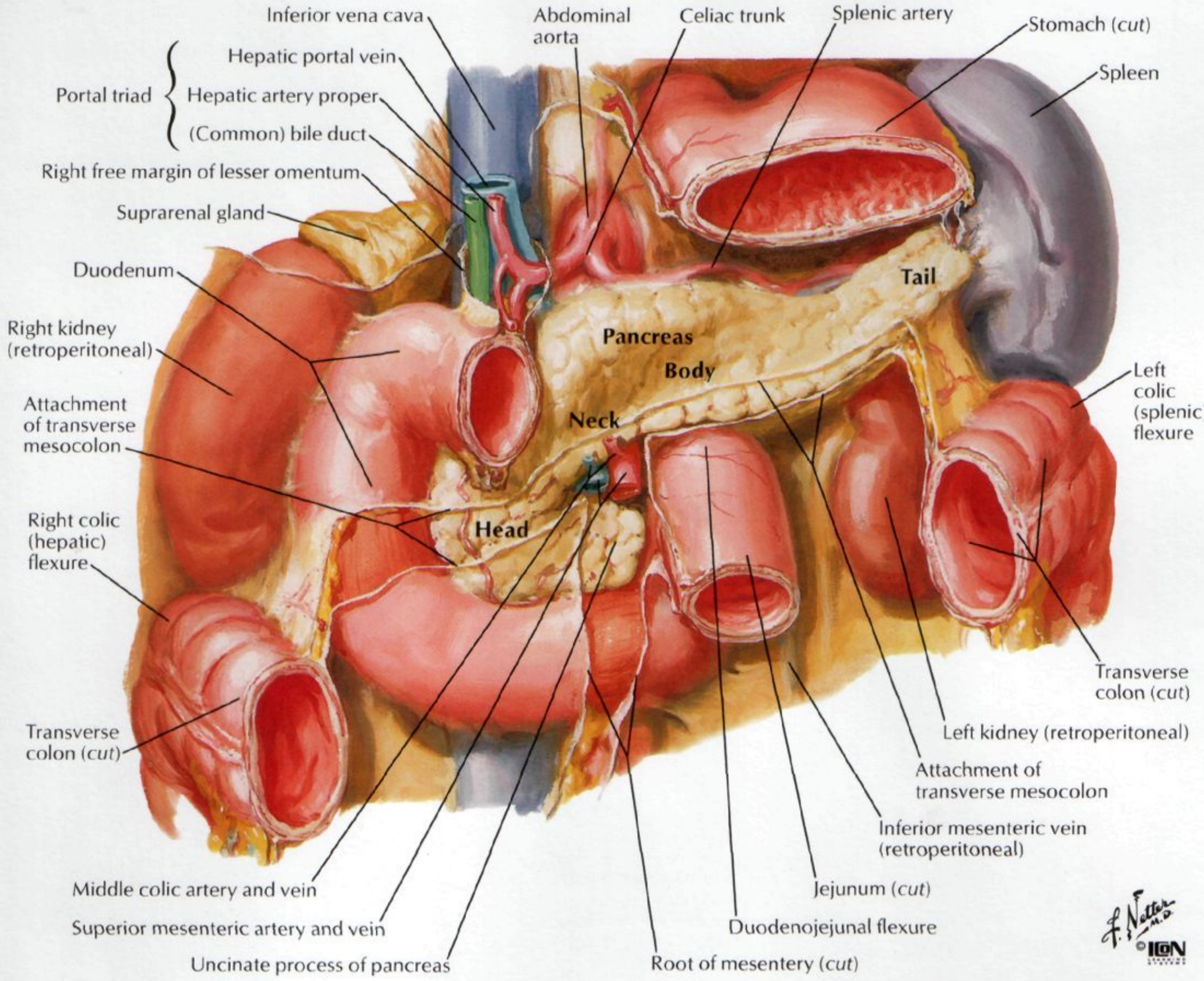
Pancreas In Situ


Inferior vena cava
Abdominal aorta
Celiac trunk
Splenic artery
Stomach (*cut*)
Spleen
Portal triad
Hepatic portal vein
Hepatic artery proper
(Common) bile duct
Right free margin of lesser omentum
Suprarenal gland
Duodenum
Right kidney (retroperitoneal)
Attachment of transverse mesocolon
Right colic (hepatic) flexure
Transverse colon (*cut*)
Tail
Pancreas
Body
Neck
Head
Left colic (splenic) flexure
Transverse colon (*cut*)
Left kidney (retroperitoneal)
Attachment of transverse mesocolon
Inferior mesenteric vein (retroperitoneal)
Jejunum (*cut*)
Duodenojejunal flexure
Root of mesentery (*cut*)
Middle colic artery and vein
Superior mesenteric artery and vein
Uncinate process of pancreas
F. Netter M.D.
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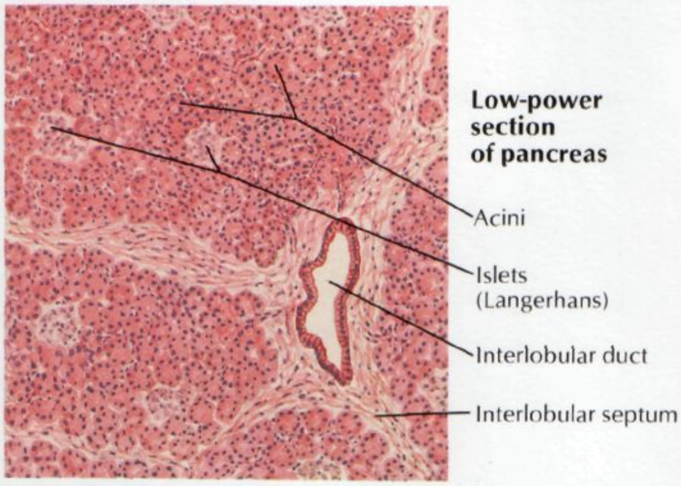
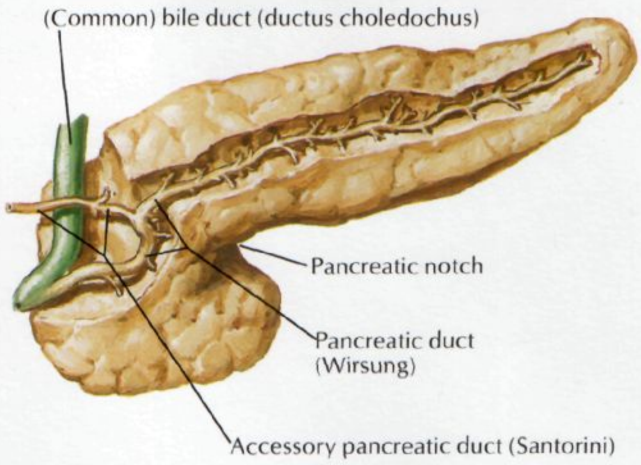
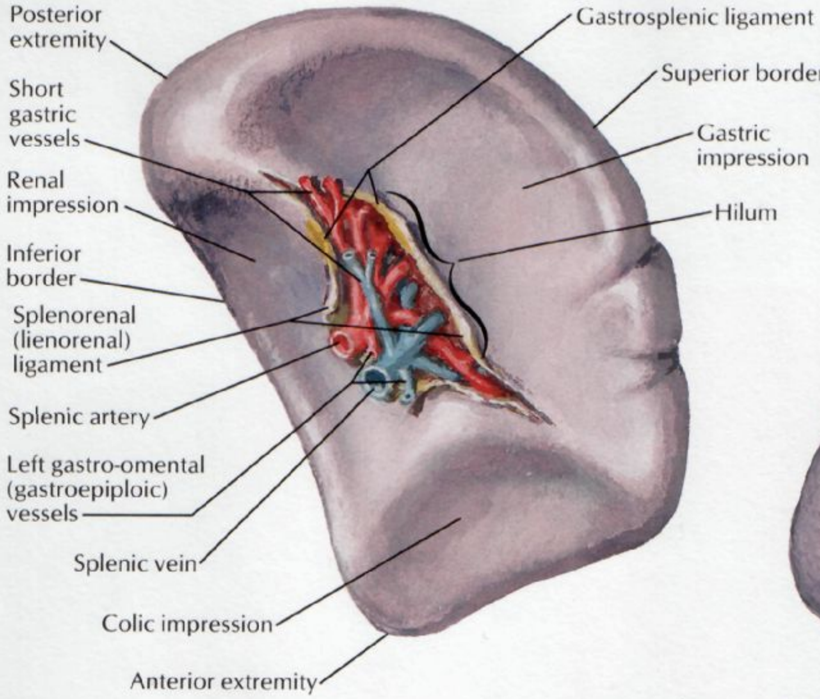


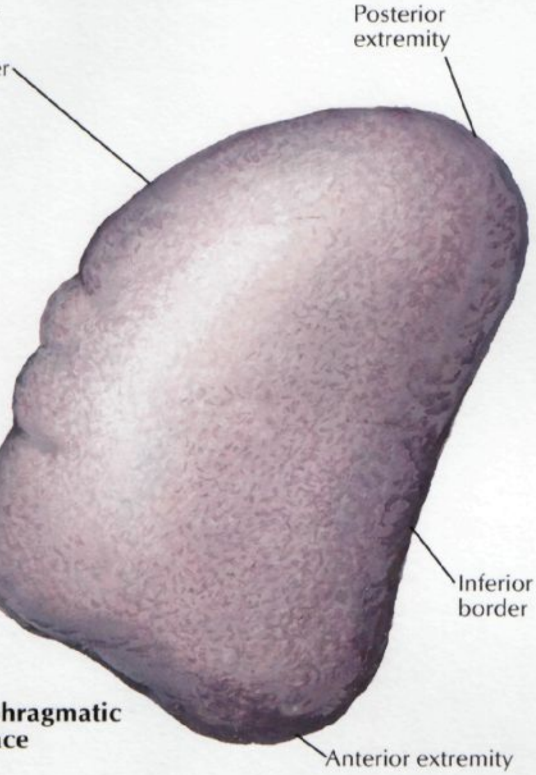
Low-power section of pancreas


(Common) bile duct (ductus choledochus)
Pancreatic notch
Pancreatic duct (Wirsung)
Accessory pancreatic duct (Santorini)

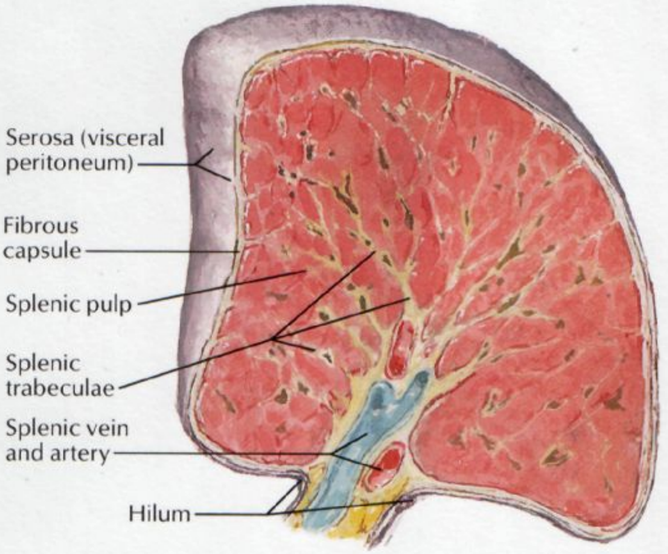
Spleen



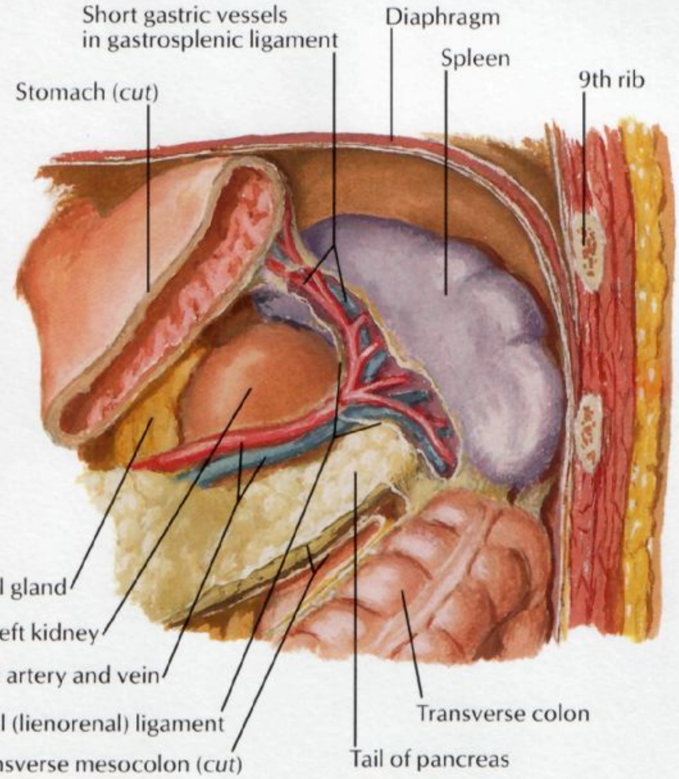
Visceral surface



Diaphragmatic surface



Cross section


Short gastric vessels in gastrosplenic ligament
Diaphragm
Spleen
9th rib
Stomach (*cut*)
Suprarenal gland
Left kidney
Splenic artery and vein
Splenorenal (lienorenal) ligament
Attachment of transverse mesocolon (*cut*)
Tail of pancreas
Transverse colon

Spleen in situ

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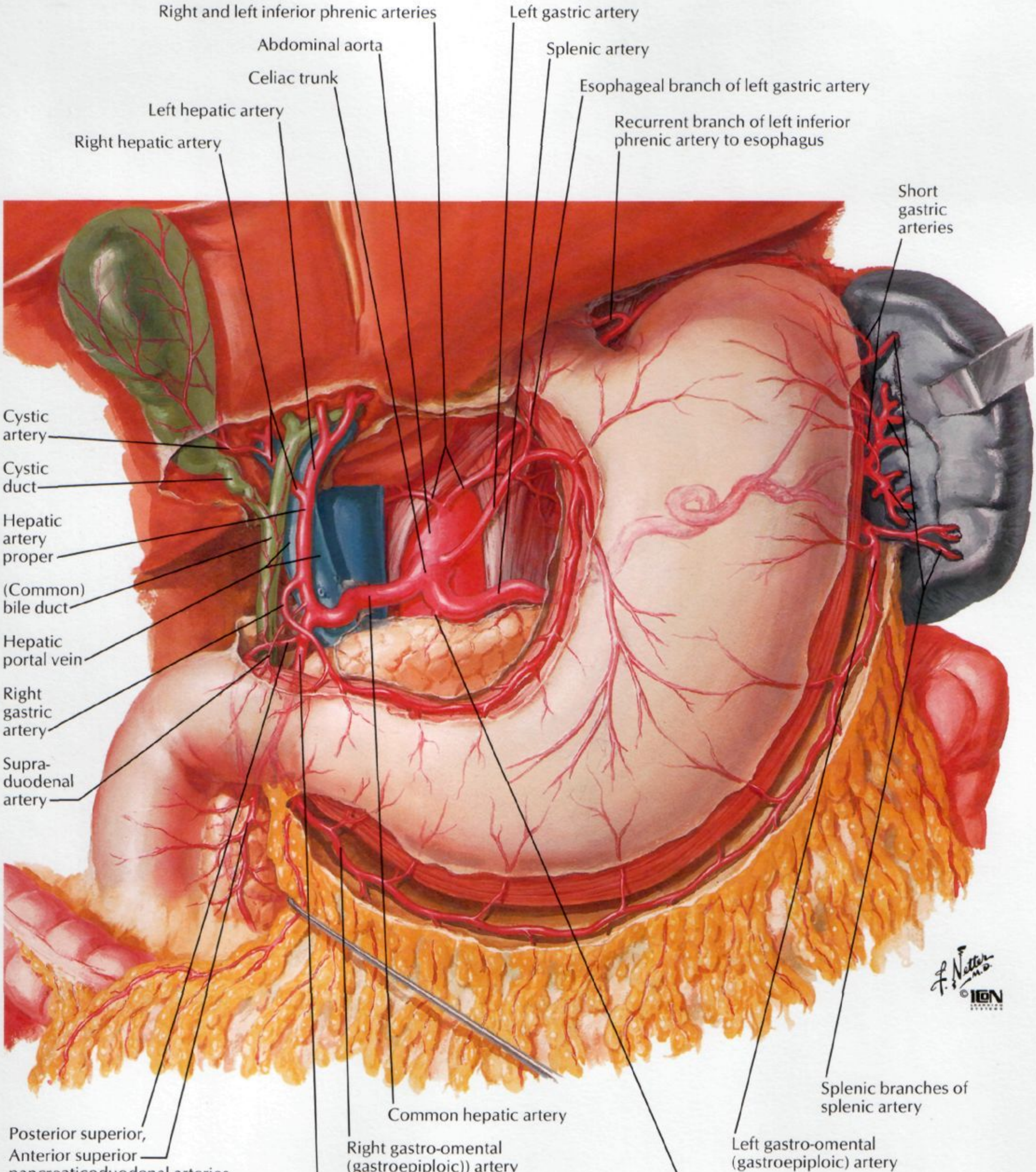
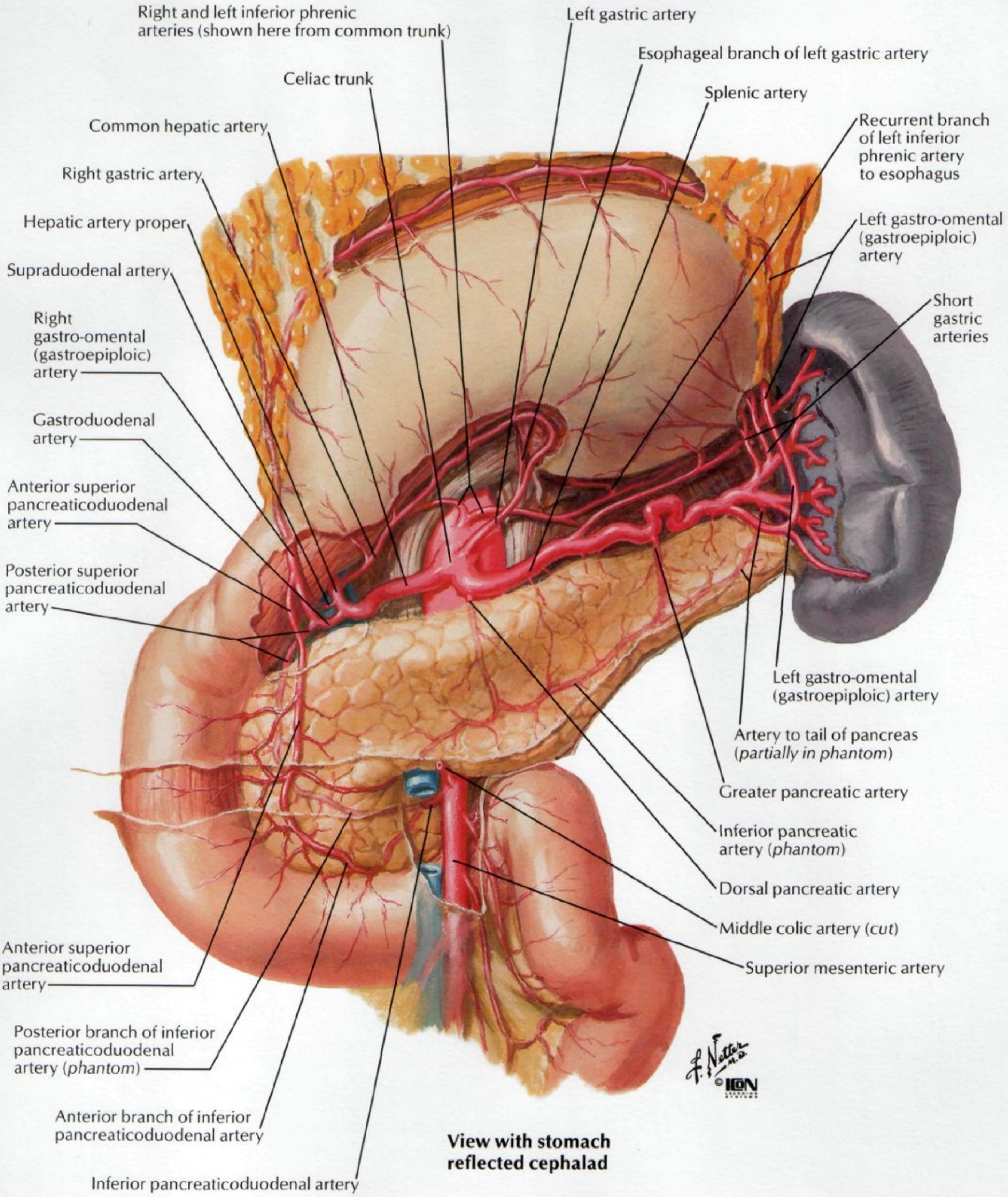
Arteries of Stomach, Liver and Spleen



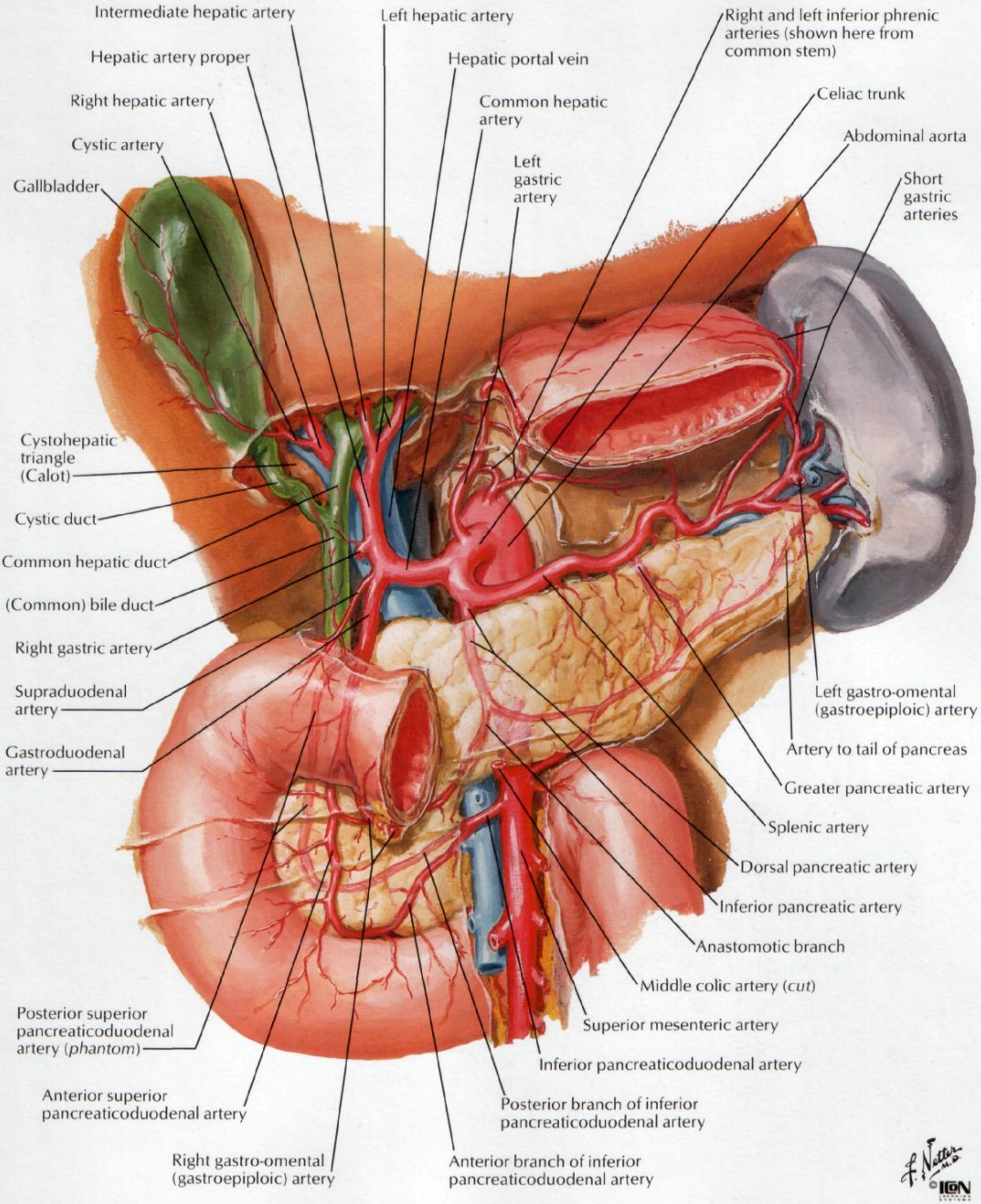
Arteries of Stomach, Duodenum, Pancreas and Spleen



Right and left inferior phrenic arteries (shown here from common trunk)
Left gastric artery
Esophageal branch of left gastric artery
Celiac trunk
Splenic artery
Common hepatic artery
Recurrent branch of left inferior phrenic artery to esophagus
Right gastric artery
Hepatic artery proper
Left gastro-omental (gastroepiploic) artery
Supraduodenal artery
Short gastric arteries
Right gastro-omental (gastroepiploic) artery
Gastroduodenal artery
Anterior superior pancreaticoduodenal artery
Posterior superior pancreaticoduodenal artery
Left gastro-omental (gastroepiploic) artery
Artery to tail of pancreas (*partially in phantom*)
Greater pancreatic artery
Inferior pancreatic artery (*phantom*)
Dorsal pancreatic artery
Middle colic artery (*cut*)
Superior mesenteric artery
Anterior superior pancreaticoduodenal artery
Posterior branch of inferior pancreaticoduodenal artery (*phantom*)
Anterior branch of inferior pancreaticoduodenal artery
Inferior pancreaticoduodenal artery

View with stomach reflected cephalad

Arteries of Liver, Pancreas, Duodenum and Spleen


Intermediate hepatic artery
Left hepatic artery
Right and left inferior phrenic arteries (shown here from common stem)
Hepatic artery proper
Hepatic portal vein
Celiac trunk
Right hepatic artery
Common hepatic artery
Cystic artery
Abdominal aorta
Left gastric artery
Gallbladder
Short gastric arteries
Cystohepatic triangle (Calot)
Cystic duct
Common hepatic duct
(Common) bile duct
Right gastric artery
Supraduodenal artery
Left gastro-omental (gastroepiploic) artery
Gastroduodenal artery
Artery to tail of pancreas
Greater pancreatic artery
Splenic artery
Dorsal pancreatic artery
Inferior pancreatic artery
Anastomotic branch
Middle colic artery (*cut*)
Posterior superior pancreaticoduodenal artery (*phantom*)
Superior mesenteric artery
Inferior pancreaticoduodenal artery
Anterior superior pancreaticoduodenal artery
Posterior branch of inferior pancreaticoduodenal artery
Right gastro-omental (gastroepiploic) artery
Anterior branch of inferior pancreaticoduodenal artery
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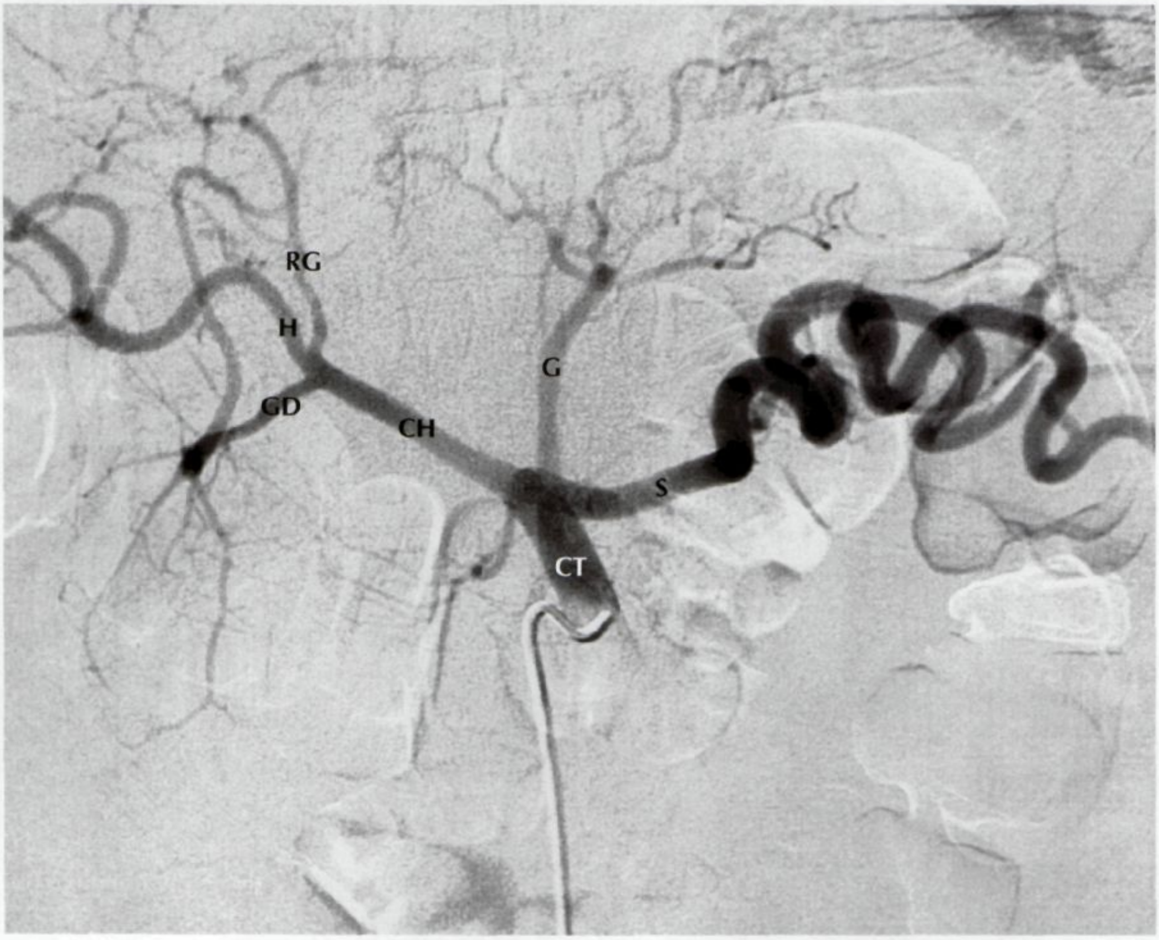
Celiac Arteriogram

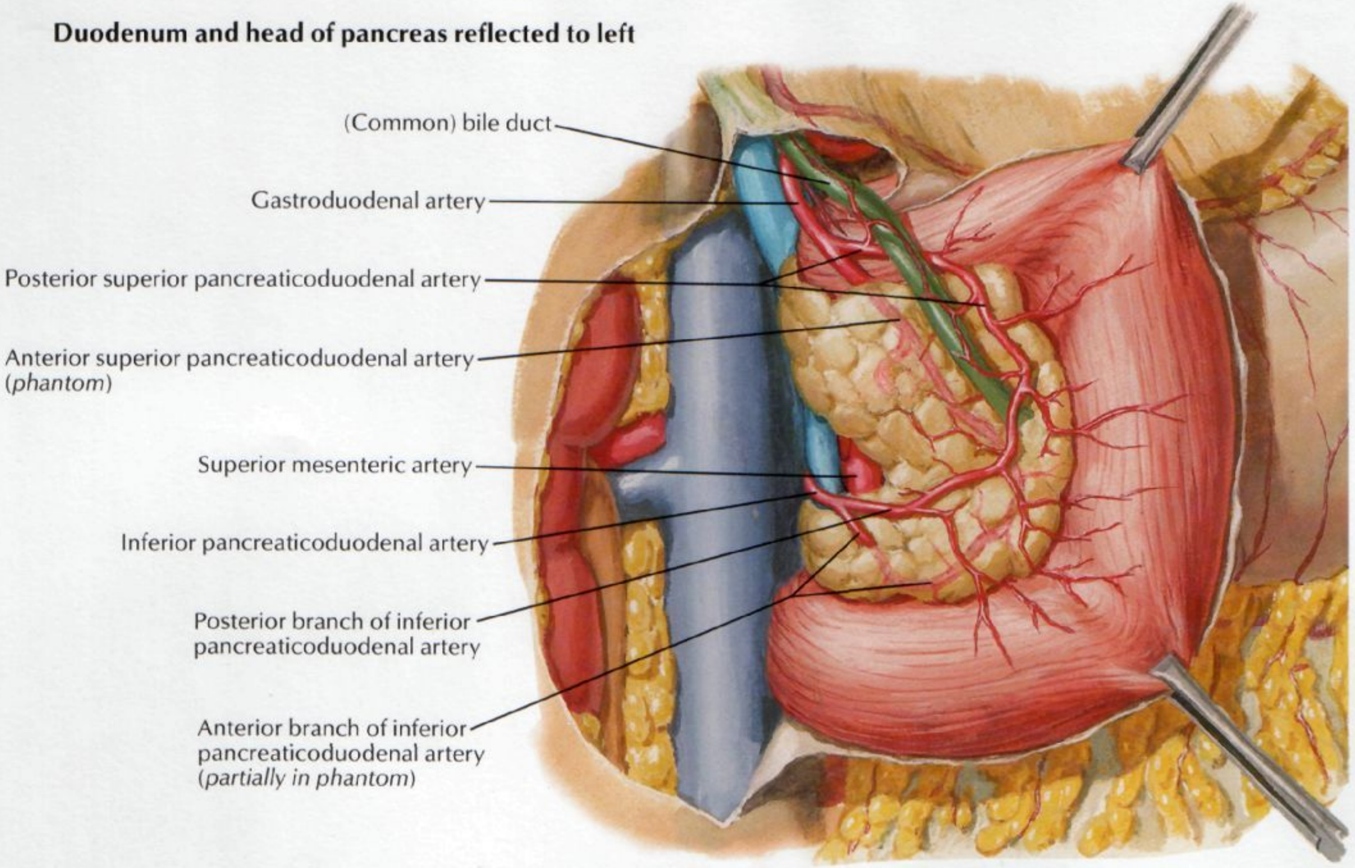
SEE ALSO PLATE 290–292

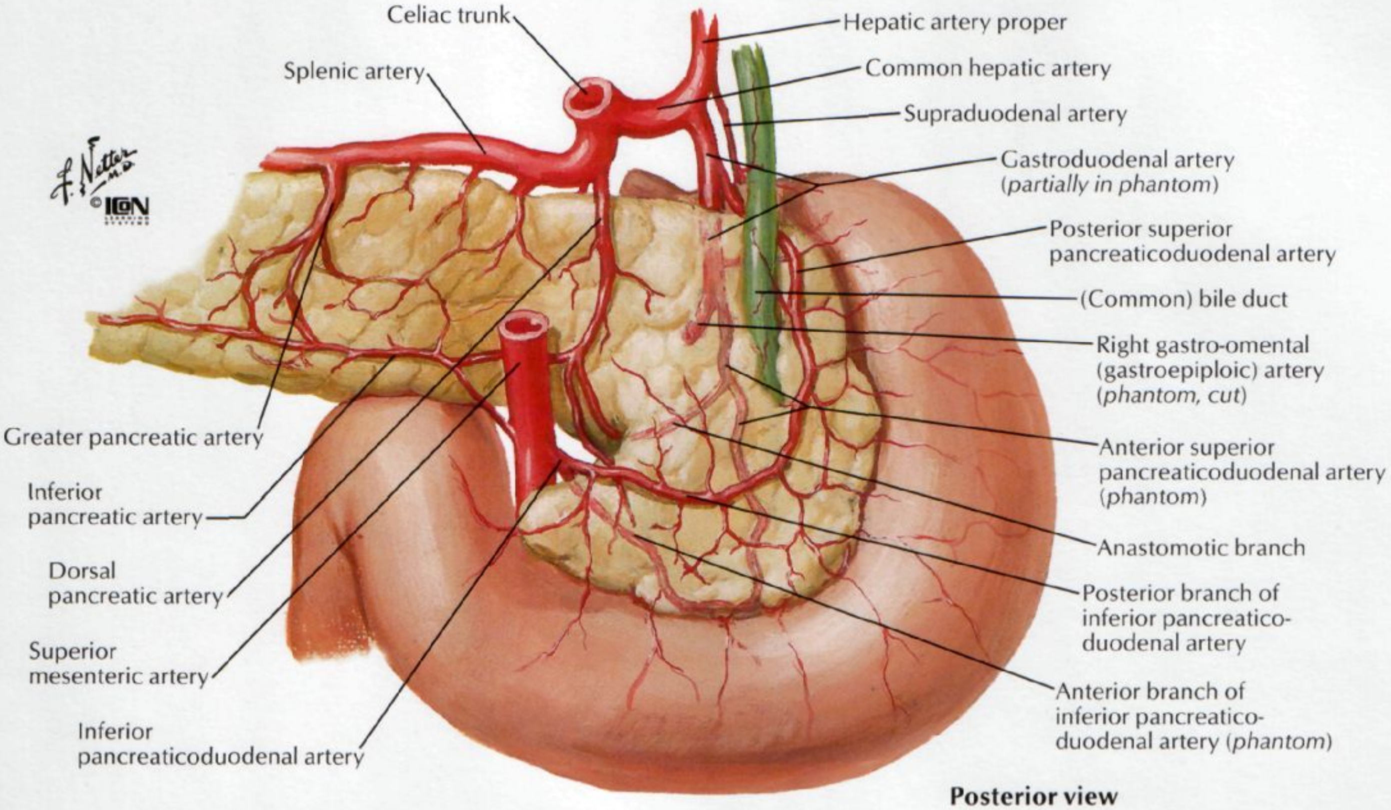


CH	Common hepatic artery
CT	Celiac trunk
G	Left gastric artery
GD	Gastroduodenal artery
H	Hepatic artery proper
RG	Right gastric artery
S	Splenic artery

Arteries of Duodenum and Head of Pancreas

Duodenum and head of pancreas reflected to left


(Common) bile duct
Gastroduodenal artery
Posterior superior pancreaticoduodenal artery
Anterior superior pancreaticoduodenal artery (*phantom*)
Superior mesenteric artery
Inferior pancreaticoduodenal artery
Posterior branch of inferior pancreaticoduodenal artery
Anterior branch of inferior pancreaticoduodenal artery (*partially in phantom*)


Celiac trunk
Hepatic artery proper
Splenic artery
Common hepatic artery
Supraduodenal artery
Gastroduodenal artery (*partially in phantom*)
Posterior superior pancreaticoduodenal artery
(Common) bile duct
Right gastro-omental (gastroepiploic) artery (*phantom, cut*)
Greater pancreatic artery
Anterior superior pancreaticoduodenal artery (*phantom*)
Inferior pancreatic artery
Anastomotic branch
Dorsal pancreatic artery
Posterior branch of inferior pancreaticoduodenal artery
Superior mesenteric artery
Anterior branch of inferior pancreaticoduodenal artery (*phantom*)
Inferior pancreaticoduodenal artery
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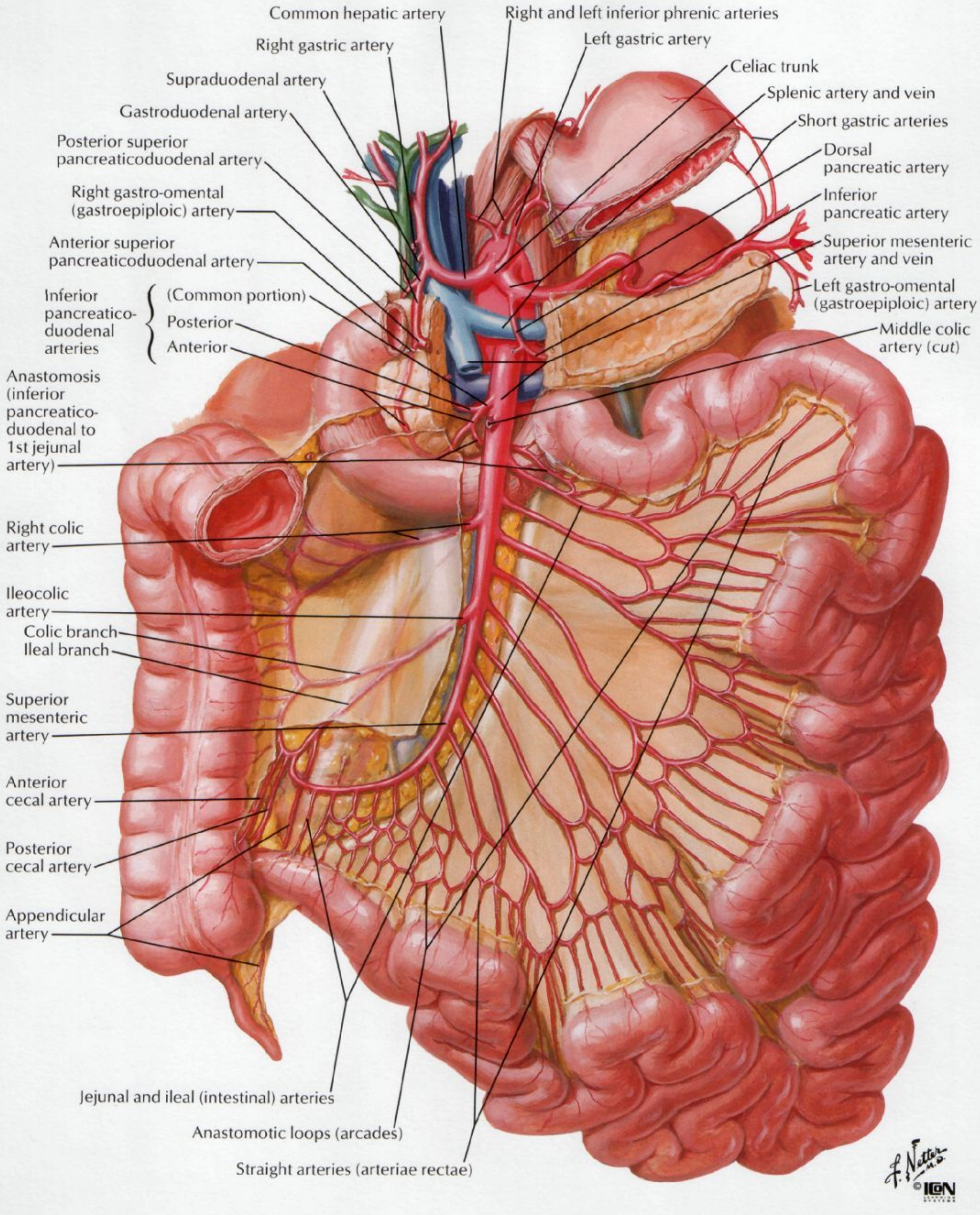
Posterior view

Arteries of Small Intestine


Common hepatic artery
Right and left inferior phrenic arteries
Left gastric artery
Right gastric artery
Celiac trunk
Supraduodenal artery
Splenic artery and vein
Gastroduodenal artery
Short gastric arteries
Posterior superior pancreaticoduodenal artery
Dorsal pancreatic artery
Right gastro-omental (gastroepiploic) artery
Inferior pancreatic artery
Anterior superior pancreaticoduodenal artery
Superior mesenteric artery and vein
Left gastro-omental (gastroepiploic) artery
Inferior pancreatico-duodenal arteries
(Common portion)
Posterior
Anterior
Middle colic artery (*cut*)
Anastomosis (inferior pancreatico-duodenal to 1st jejunal artery)
Right colic artery
Ileocolic artery
Colic branch
Ileal branch
Superior mesenteric artery
Anterior cecal artery
Posterior cecal artery
Appendicular artery
Jejunal and ileal (intestinal) arteries
Anastomotic loops (arcades)
Straight arteries (arteriae rectae)
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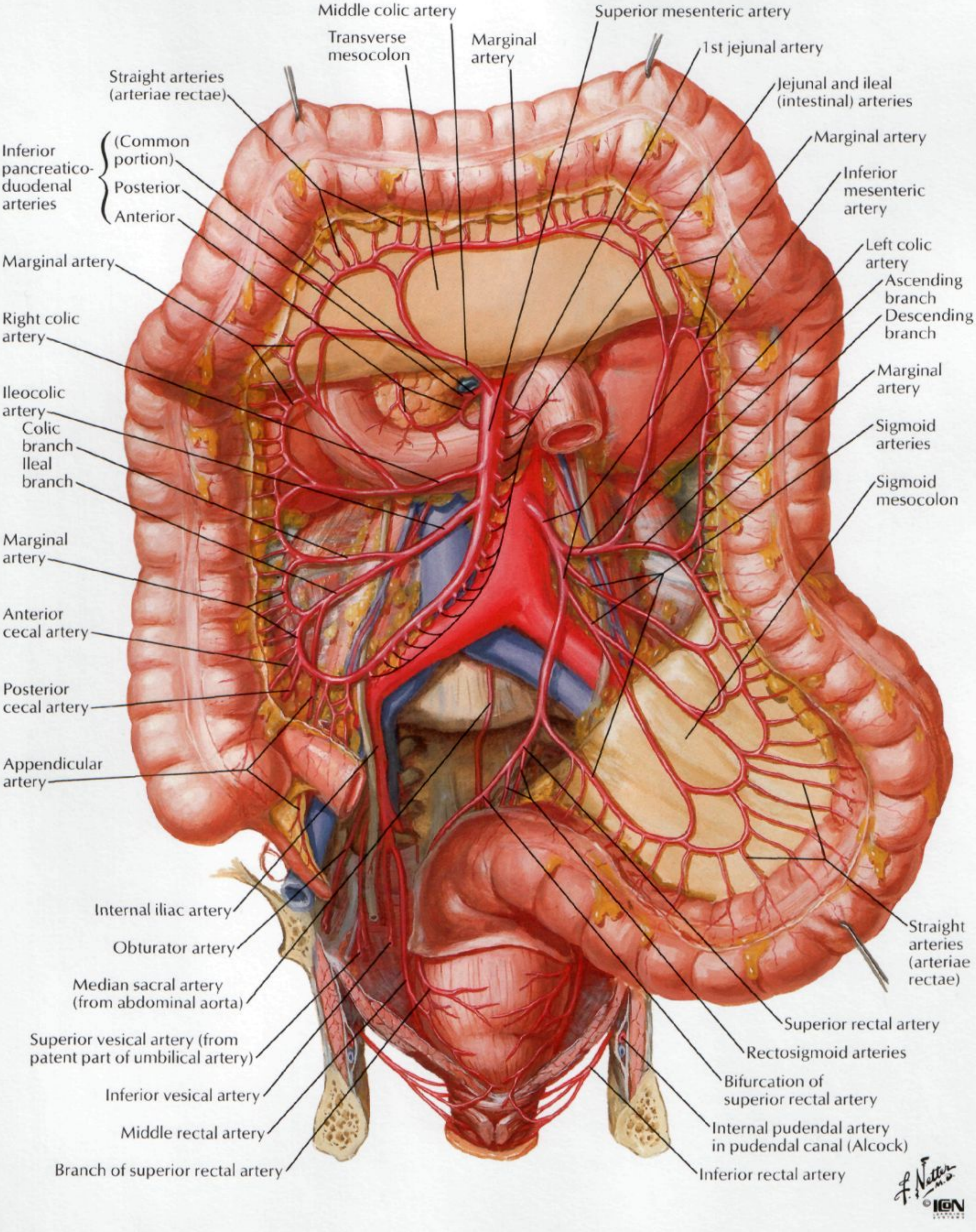
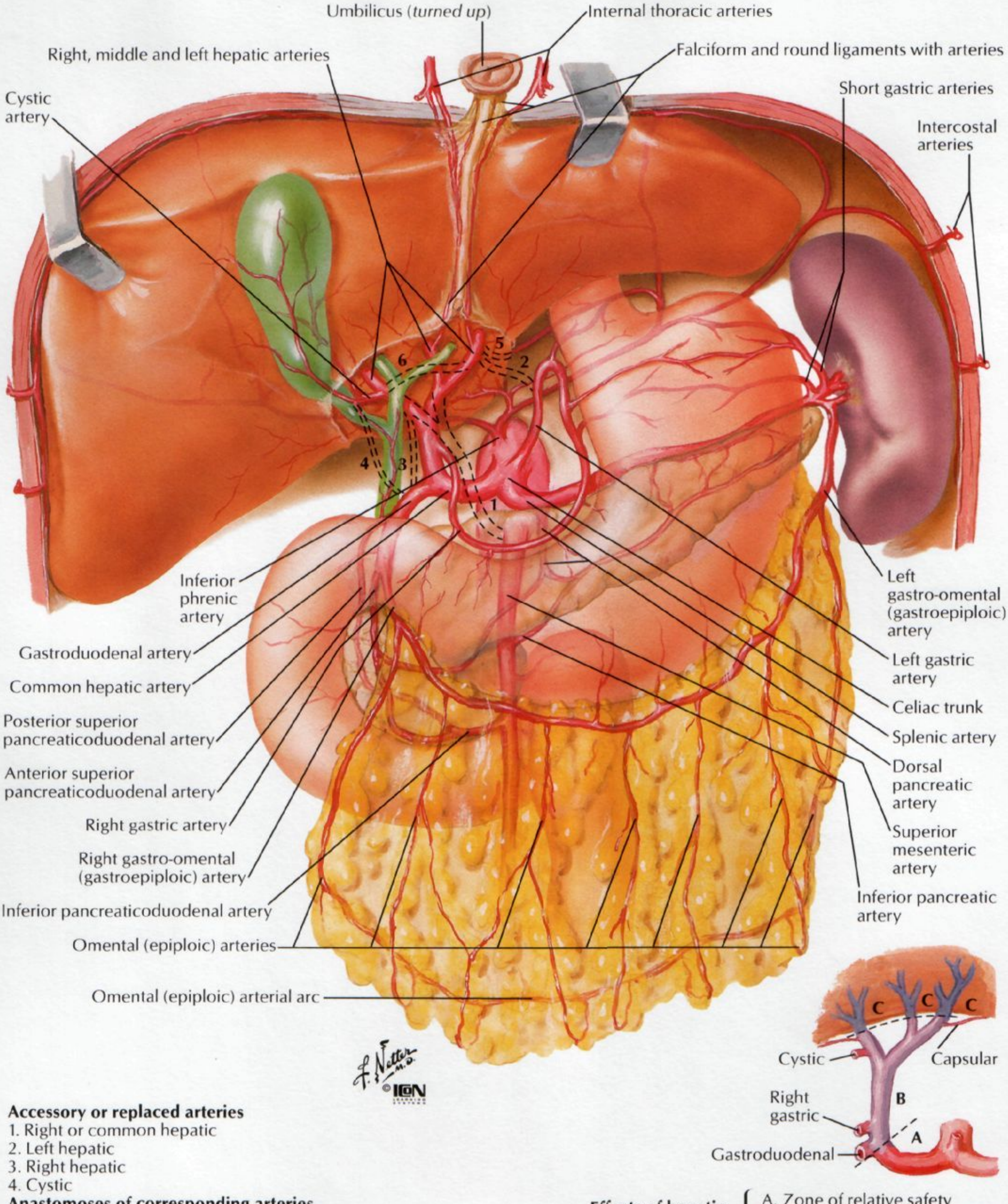
Arteries of Large Intestine

FOR ARTERIES OF RECTUM SEE ALSO PLATE 378



Arterial Variations and Collateral Supply of Liver and Gallbladder


Umbilicus (*turned up*)
Internal thoracic arteries
Right, middle and left hepatic arteries
Falciform and round ligaments with arteries
Cystic artery
Short gastric arteries
Intercostal arteries
5
6
2
4
3
1
Inferior phrenic artery
Gastroduodenal artery
Common hepatic artery
Posterior superior pancreaticoduodenal artery
Anterior superior pancreaticoduodenal artery
Right gastric artery
Right gastro-omental (gastroepiploic) artery
Inferior pancreaticoduodenal artery
Omental (epiploic) arteries
Omental (epiploic) arterial arc
Left gastro-omental (gastroepiploic) artery
Left gastric artery
Celiac trunk
Splenic artery
Dorsal pancreatic artery
Superior mesenteric artery
Inferior pancreatic artery
C
C
C
Cystic
Capsular
Right gastric
B
A
Gastroduodenal

Accessory or replaced arteries

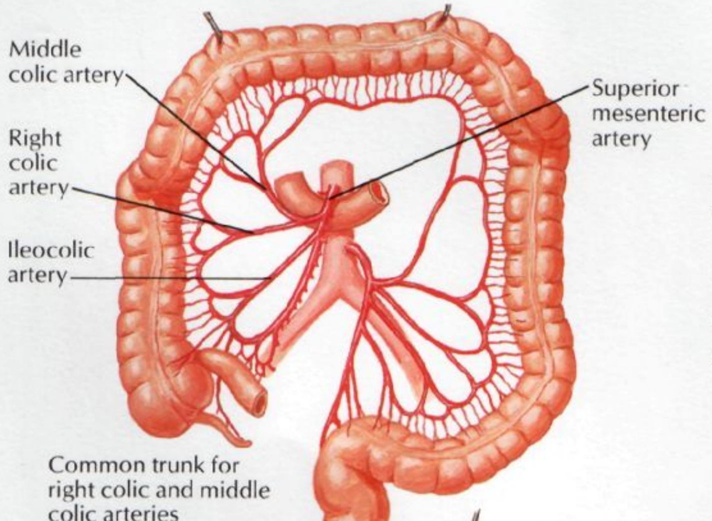
1. Right or common hepatic
2. Left hepatic
3. Right hepatic
4. Cystic

Anastomoses of corresponding arteries

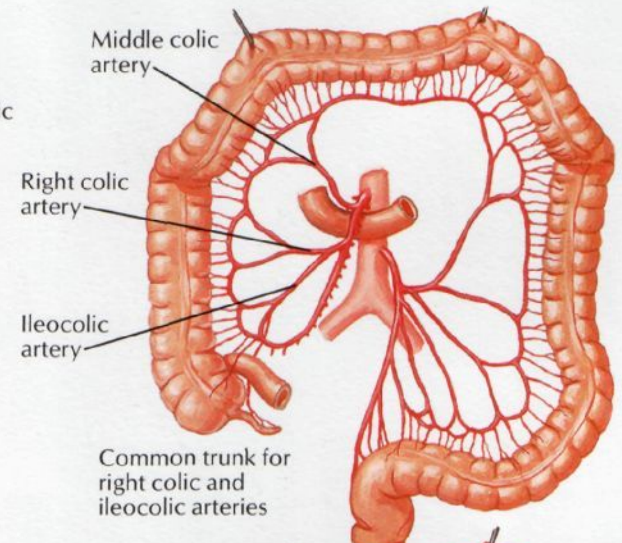
5. Inferior phrenic/left gastric ⟷ left hepatic
6. Right ⟷ left hepatic

Effects of hepatic artery obstruction
- A. Zone of relative safety
- B. Zone of questionable effects
- C. Zone of inevitable infarction

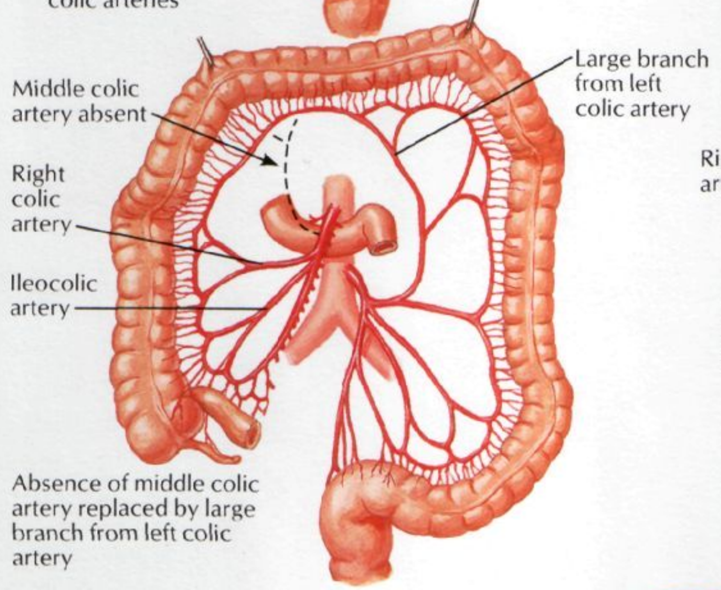
Variations in Colic Arteries



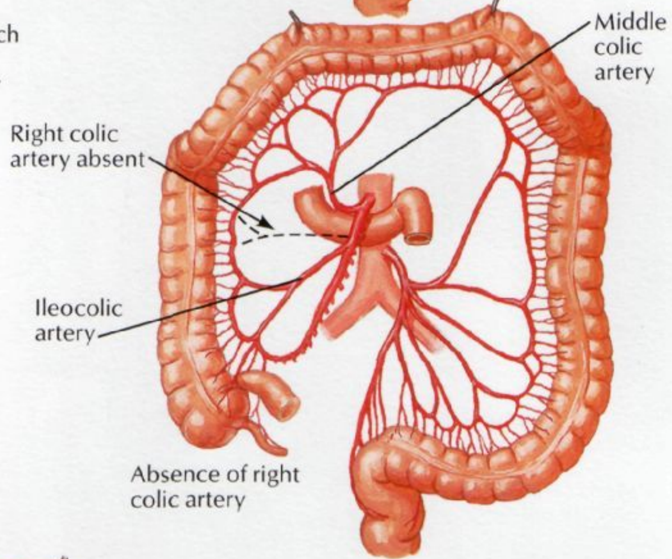
Common trunk for right colic and middle colic arteries



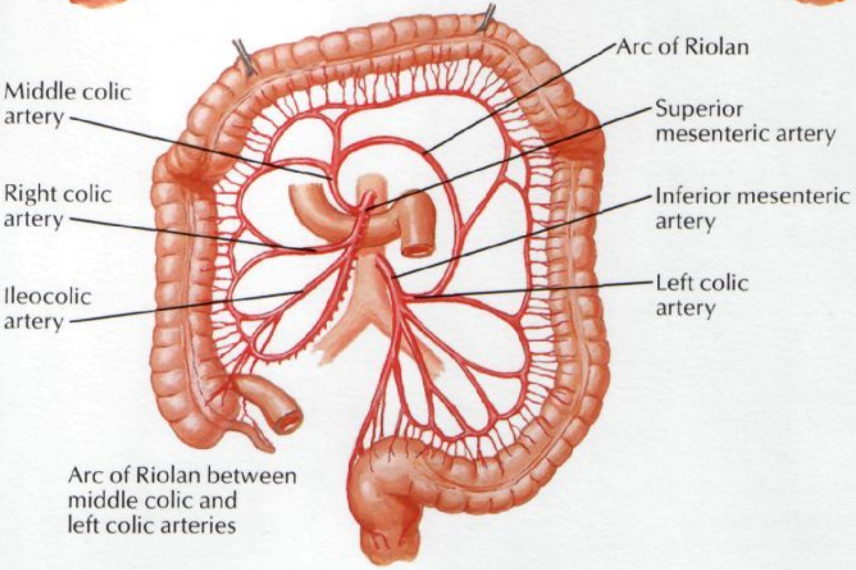
Common trunk for right colic and ileocolic arteries


Middle colic artery absent
Right colic artery
Ileocolic artery
Large branch from left colic artery

Absence of middle colic artery replaced by large branch from left colic artery



Absence of right colic artery



Arc of Riolan between middle colic and left colic arteries

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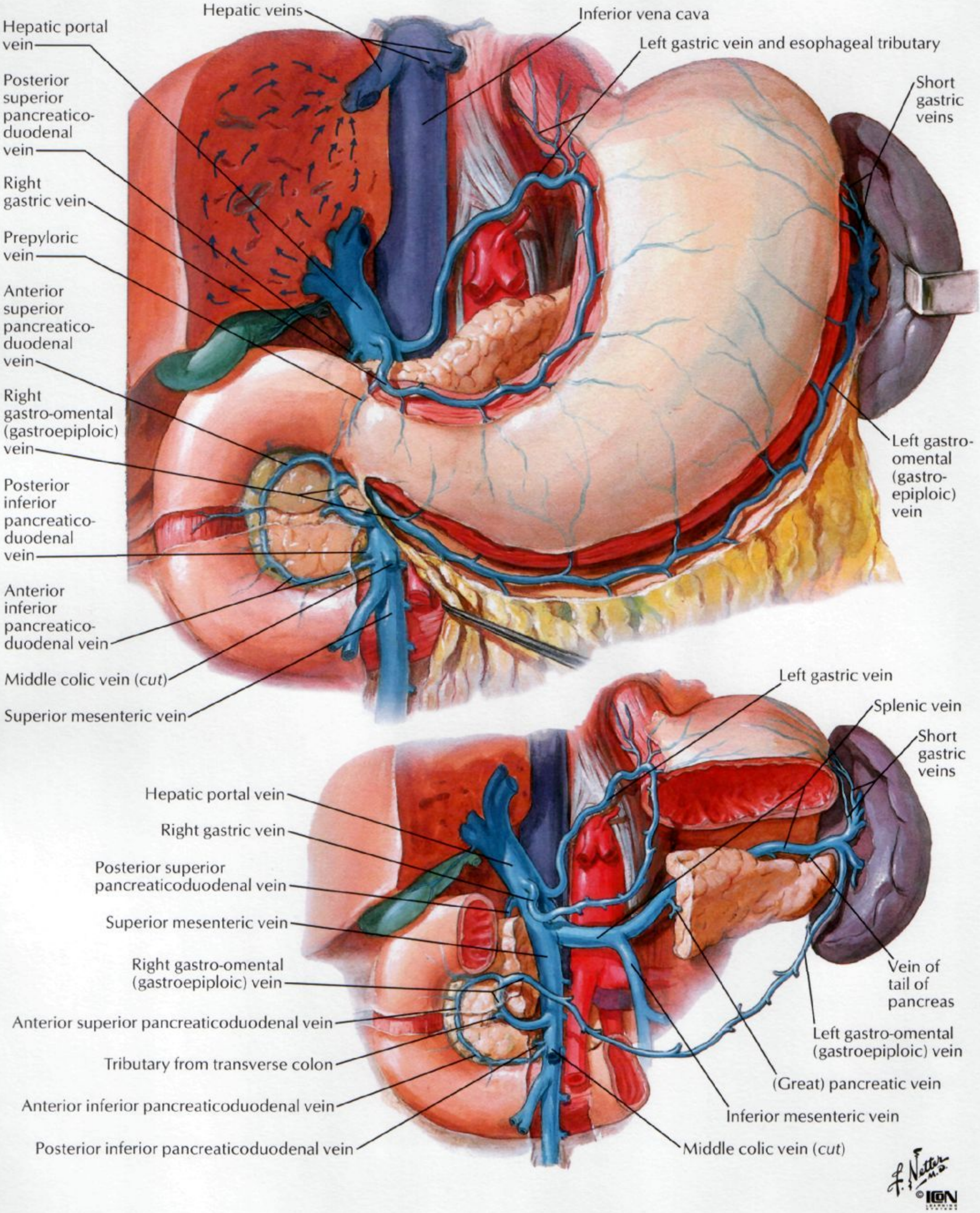
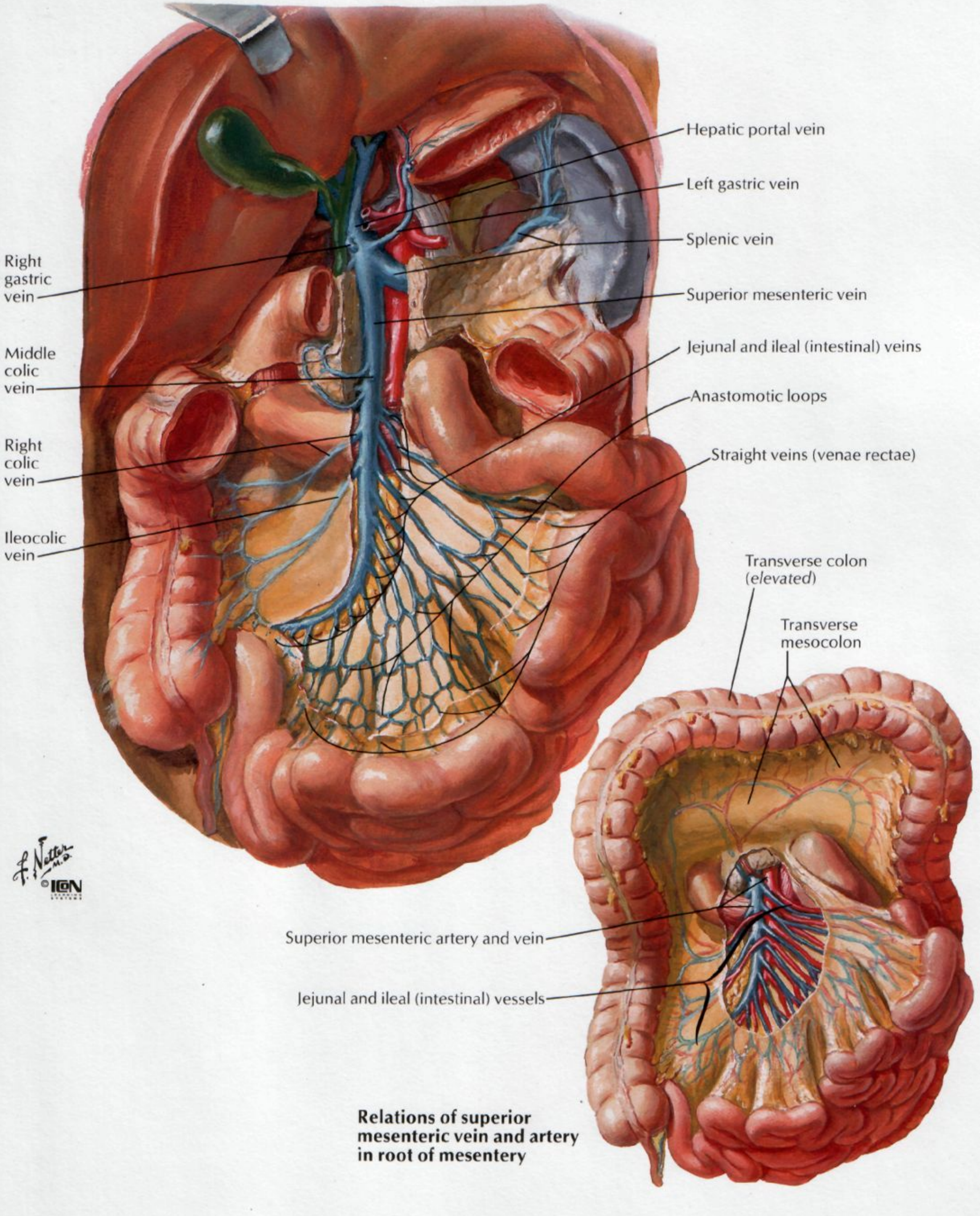
Veins of Stomach, Duodenum, Pancreas and Spleen


Hepatic veins
Inferior vena cava
Hepatic portal vein
Left gastric vein and esophageal tributary
Posterior superior pancreaticoduodenal vein
Short gastric veins
Right gastric vein
Prepyloric vein
Anterior superior pancreaticoduodenal vein
Right gastro-omental (gastroepiploic) vein
Left gastro-omental (gastroepiploic) vein
Posterior inferior pancreaticoduodenal vein
Anterior inferior pancreaticoduodenal vein
Middle colic vein (*cut*)
Superior mesenteric vein
Left gastric vein
Splenic vein
Short gastric veins
Hepatic portal vein
Right gastric vein
Posterior superior pancreaticoduodenal vein
Superior mesenteric vein
Right gastro-omental (gastroepiploic) vein
Vein of tail of pancreas
Anterior superior pancreaticoduodenal vein
Left gastro-omental (gastroepiploic) vein
Tributary from transverse colon
(Great) pancreatic vein
Anterior inferior pancreaticoduodenal vein
Inferior mesenteric vein
Posterior inferior pancreaticoduodenal vein
Middle colic vein (*cut*)

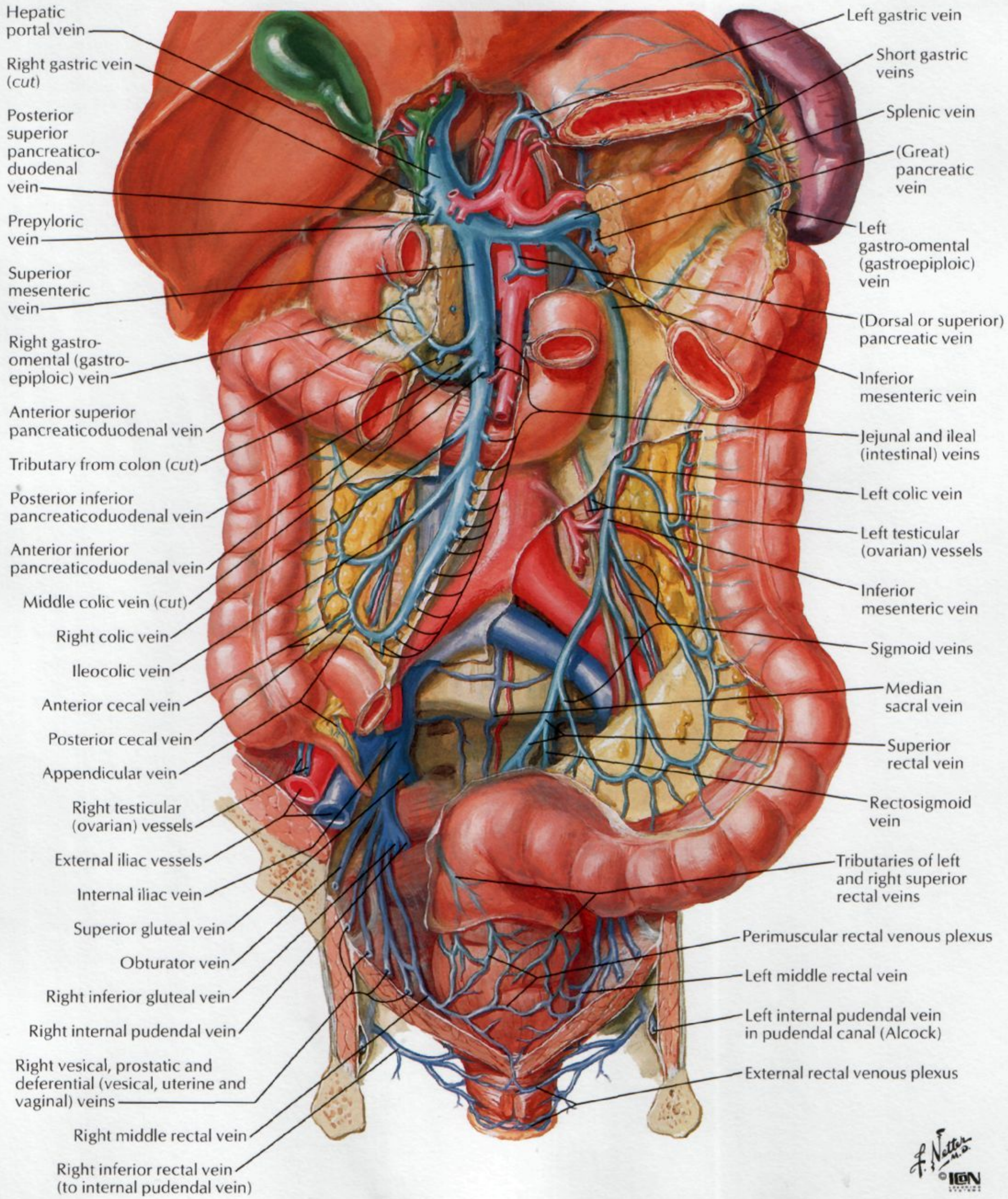
Veins of Small Intestine



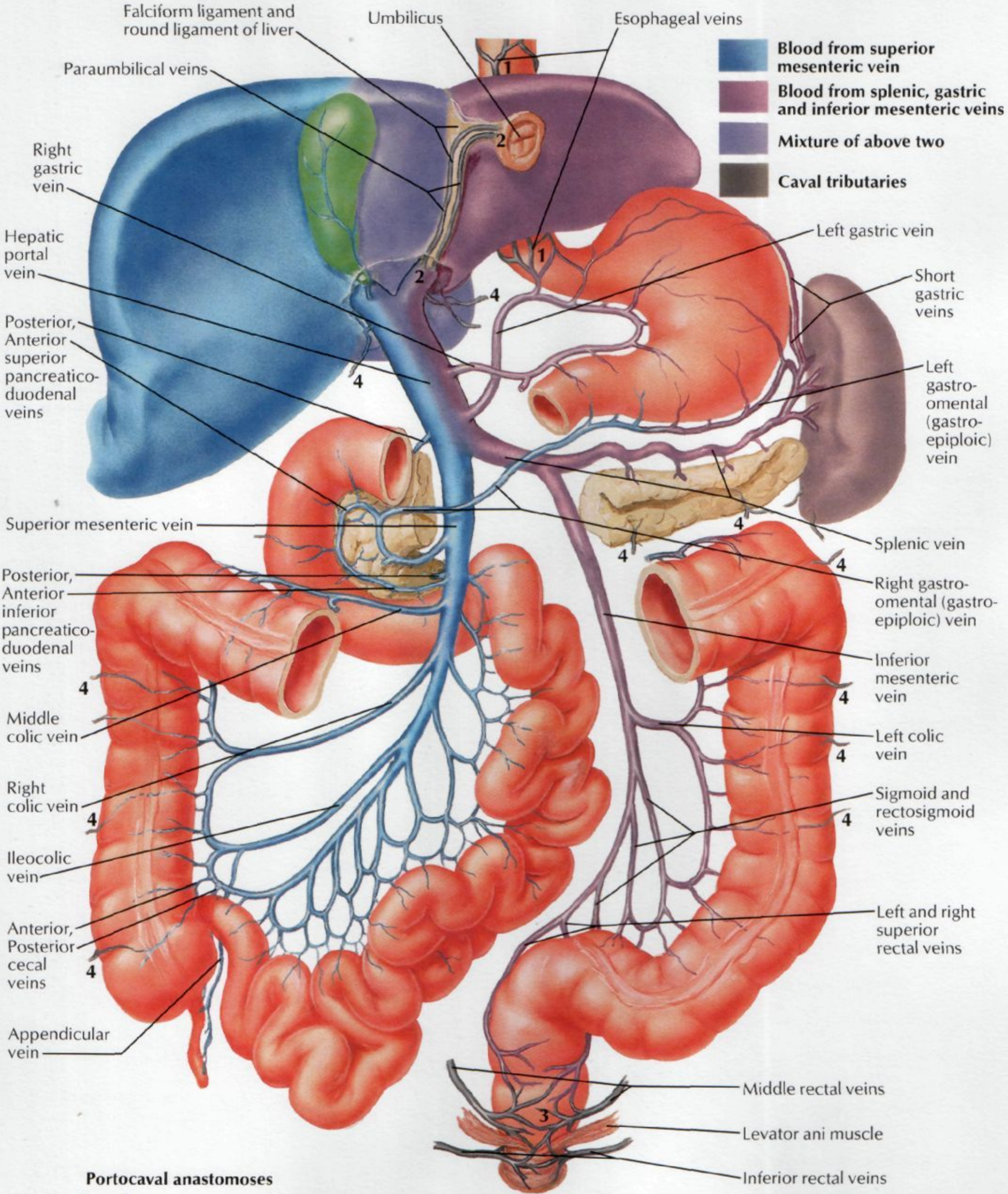
Relations of superior mesenteric vein and artery in root of mesentery

Veins of Large Intestine

FOR VEINS OF RECTUM SEE ALSO PLATE 379


Hepatic portal vein
Right gastric vein (*cut*)
Posterior superior pancreaticoduodenal vein
Prepyloric vein
Superior mesenteric vein
Right gastro-omental (gastroepiploic) vein
Anterior superior pancreaticoduodenal vein
Tributary from colon (*cut*)
Posterior inferior pancreaticoduodenal vein
Anterior inferior pancreaticoduodenal vein
Middle colic vein (*cut*)
Right colic vein
Ileocolic vein
Anterior cecal vein
Posterior cecal vein
Appendicular vein
Right testicular (ovarian) vessels
External iliac vessels
Internal iliac vein
Superior gluteal vein
Obturator vein
Right inferior gluteal vein
Right internal pudendal vein
Right vesical, prostatic and deferential (vesical, uterine and vaginal) veins
Right middle rectal vein
Right inferior rectal vein (to internal pudendal vein)
Left gastric vein
Short gastric veins
Splenic vein
(Great) pancreatic vein
Left gastro-omental (gastroepiploic) vein
(Dorsal or superior) pancreatic vein
Inferior mesenteric vein
Jejunal and ileal (intestinal) veins
Left colic vein
Left testicular (ovarian) vessels
Inferior mesenteric vein
Sigmoid veins
Median sacral vein
Superior rectal vein
Rectosigmoid vein
Tributaries of left and right superior rectal veins
Perimuscular rectal venous plexus
Left middle rectal vein
Left internal pudendal vein in pudendal canal (Alcock)
External rectal venous plexus

Hepatic Portal Vein Tributaries: Portocaval Anastomoses


Falciform ligament and round ligament of liver
Umbilicus
Esophageal veins
Paraumbilical veins
Blood from superior mesenteric vein
Blood from splenic, gastric and inferior mesenteric veins
Mixture of above two
Caval tributaries
Right gastric vein
Hepatic portal vein
Posterior, Anterior superior pancreaticoduodenal veins
Left gastric vein
Short gastric veins
Left gastro-omental (gastro-epiploic) vein
Superior mesenteric vein
Splenic vein
Posterior, Anterior inferior pancreaticoduodenal veins
Right gastro-omental (gastro-epiploic) vein
Inferior mesenteric vein
Middle colic vein
Left colic vein
Right colic vein
Sigmoid and rectosigmoid veins
Ileocolic vein
Anterior, Posterior cecal veins
Left and right superior rectal veins
Appendicular vein
Middle rectal veins
Levator ani muscle
Inferior rectal veins
1
2
3
4
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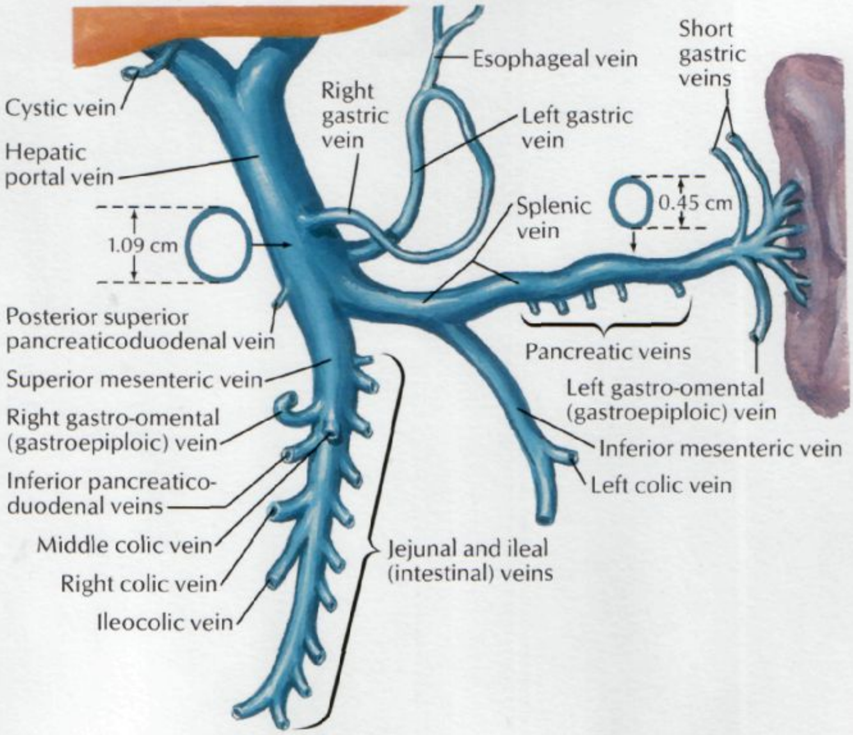
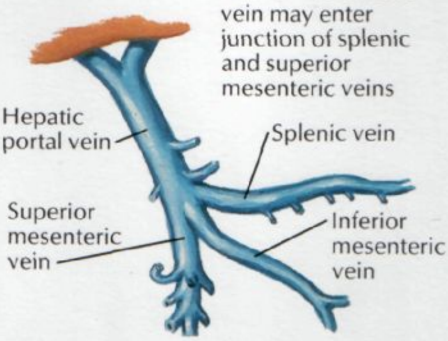
Portocaval anastomoses

- 1 Esophageal
- 2 Paraumbilical
- 3 Rectal
- 4 Retroperitoneal

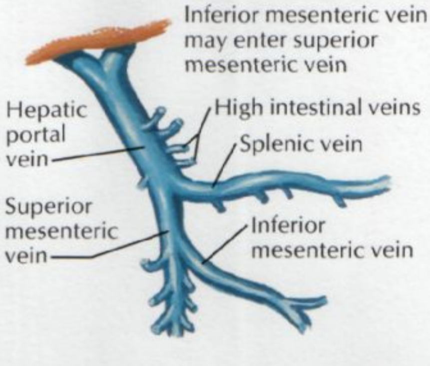
Variations of Hepatic Portal Vein



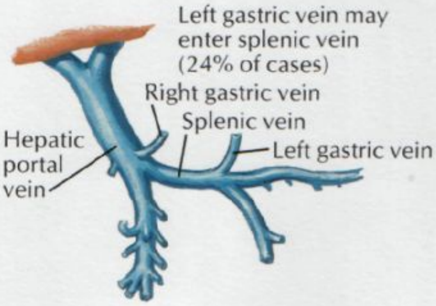
Typical arrangement



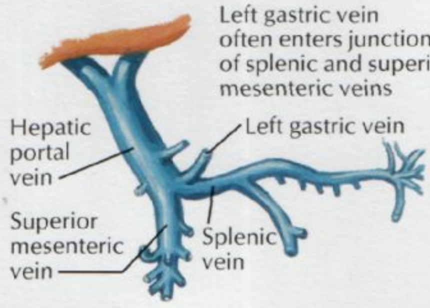
Inferior mesenteric vein may enter junction of splenic and superior mesenteric veins



Inferior mesenteric vein may enter superior mesenteric vein



Left gastric vein may enter splenic vein (24% of cases)



Left gastric vein often enters junction of splenic and superior mesenteric veins

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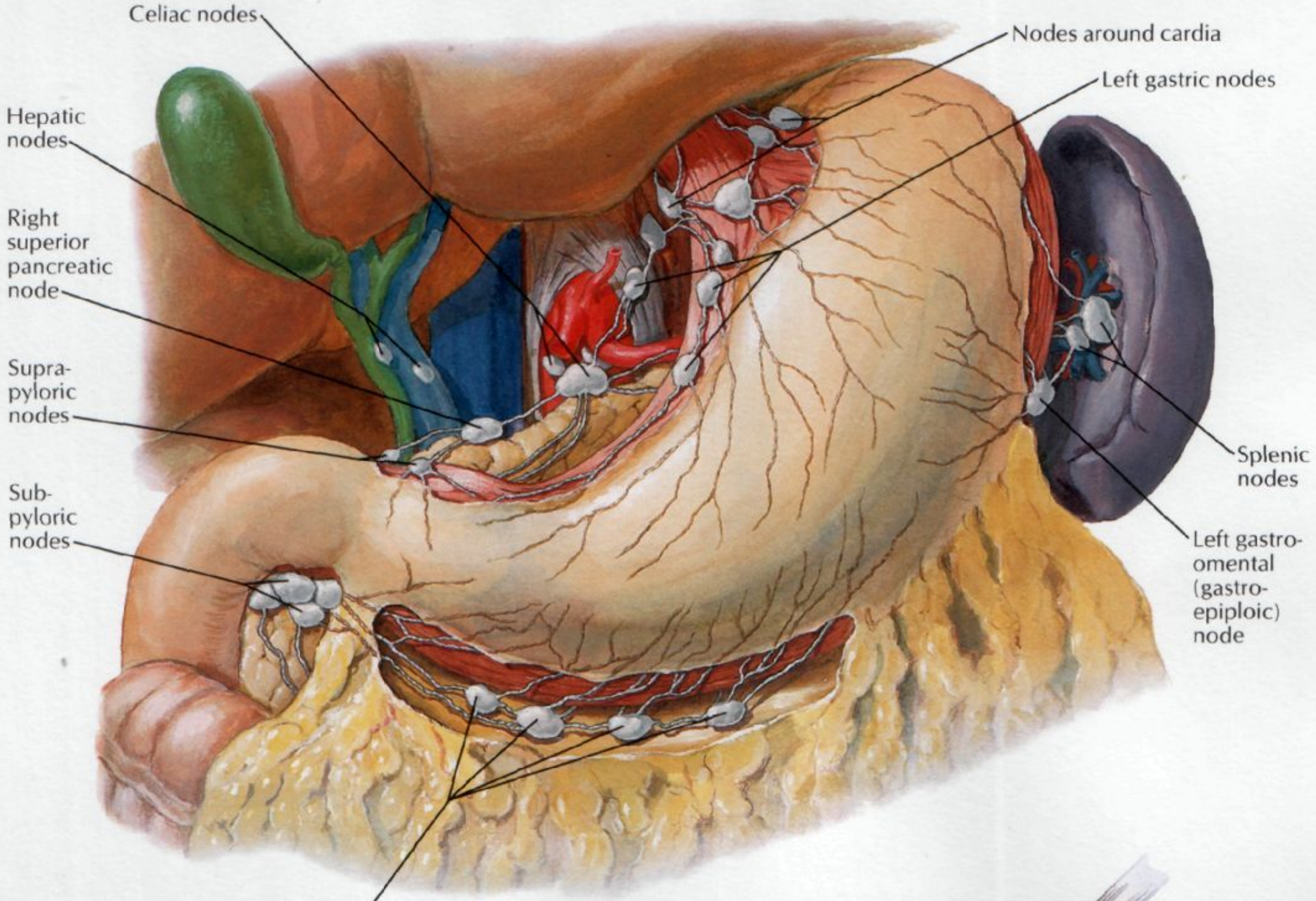
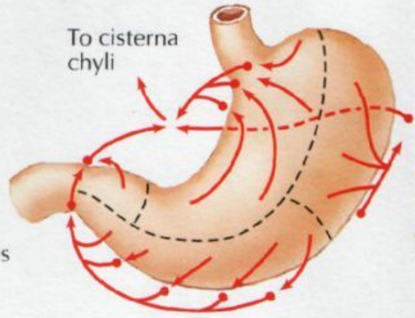
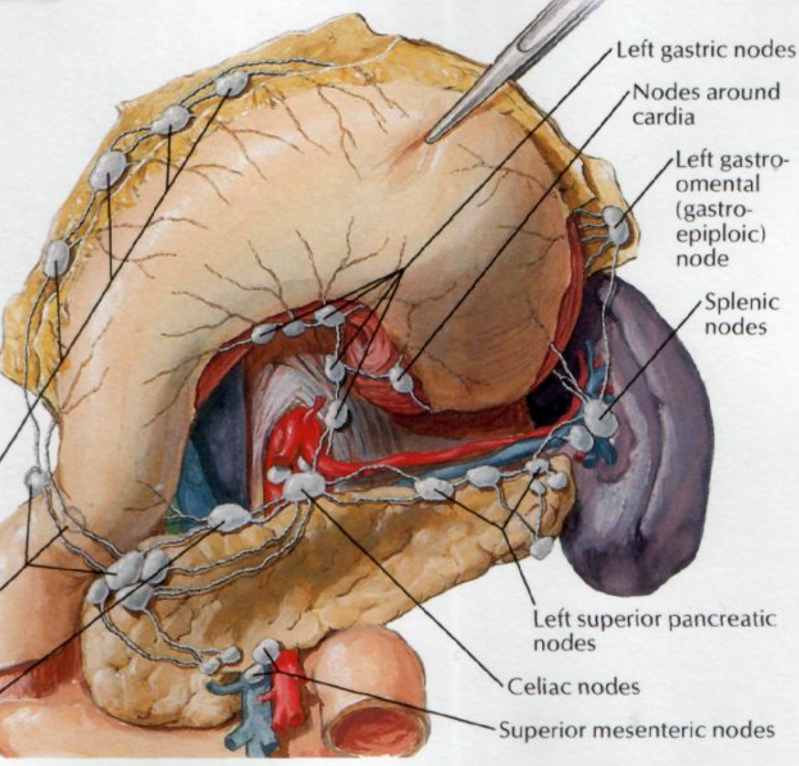
Lymph Vessels and Nodes of Stomach

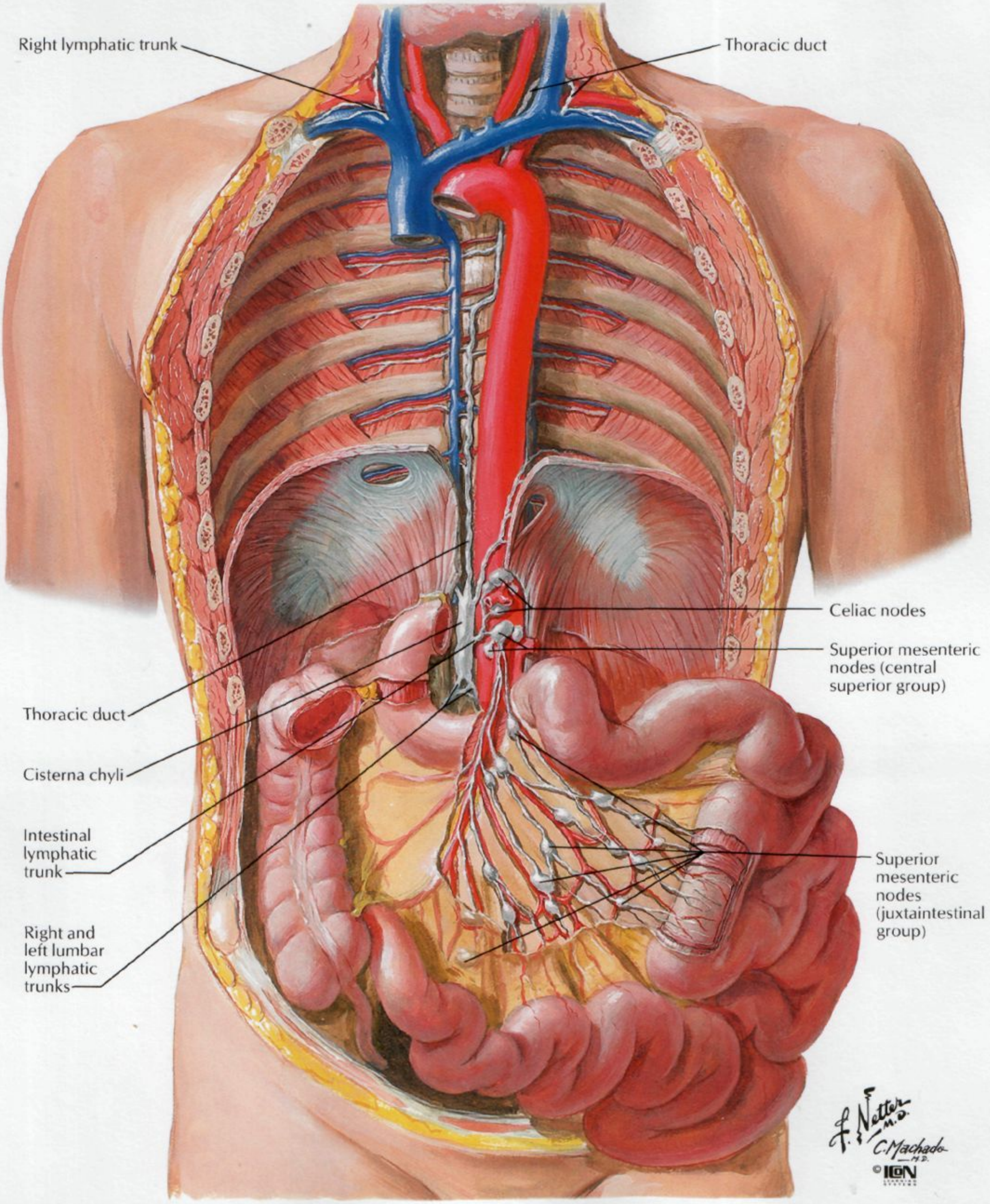

Celiac nodes
Nodes around cardia
Left gastric nodes
Hepatic nodes
Right superior pancreatic node
Supra-pyloric nodes
Sub-pyloric nodes
Splenic nodes
Left gastro-omental (gastro-epiploic) node
Right gastro-omental (gastroepiploic) nodes



Zones and pathways of gastric lymph drainage (zones not sharply demarcated)


Left gastric nodes
Nodes around cardia
Left gastro-omental (gastro-epiploic) node
Splenic nodes
Right gastro-omental (gastroepiploic) nodes
Suprapyloric, retropyloric and subpyloric nodes
Left superior pancreatic nodes
Celiac nodes
Right superior pancreatic node
Superior mesenteric nodes

Lymph Vessels and Nodes of Small Intestine


Right lymphatic trunk
Thoracic duct
Celiac nodes
Superior mesenteric nodes (central superior group)
Thoracic duct
Cisterna chyli
Intestinal lymphatic trunk
Superior mesenteric nodes (juxtaintestinal group)
Right and left lumbar lymphatic trunks
F. Netter M.D.
C. Machado M.D.
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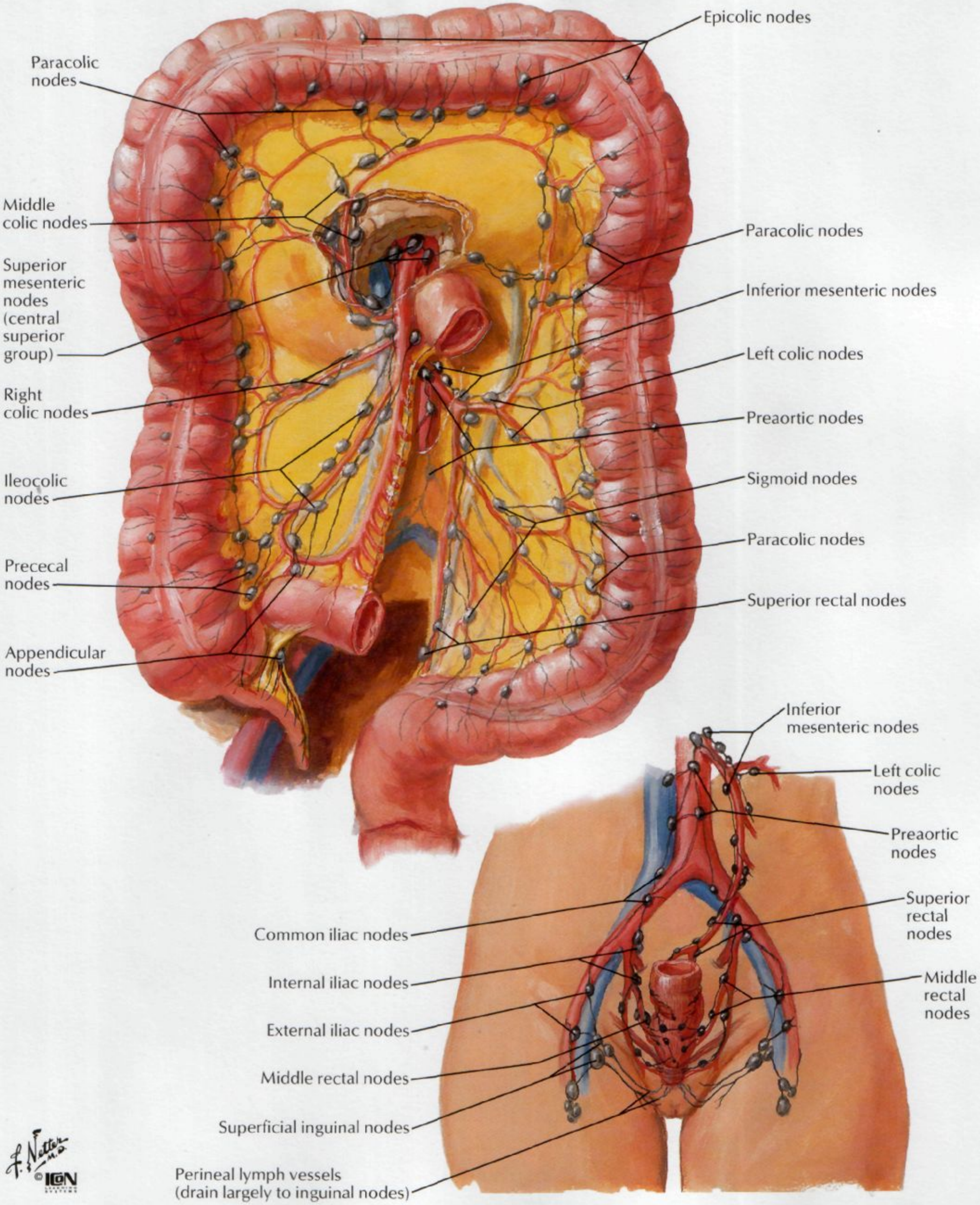
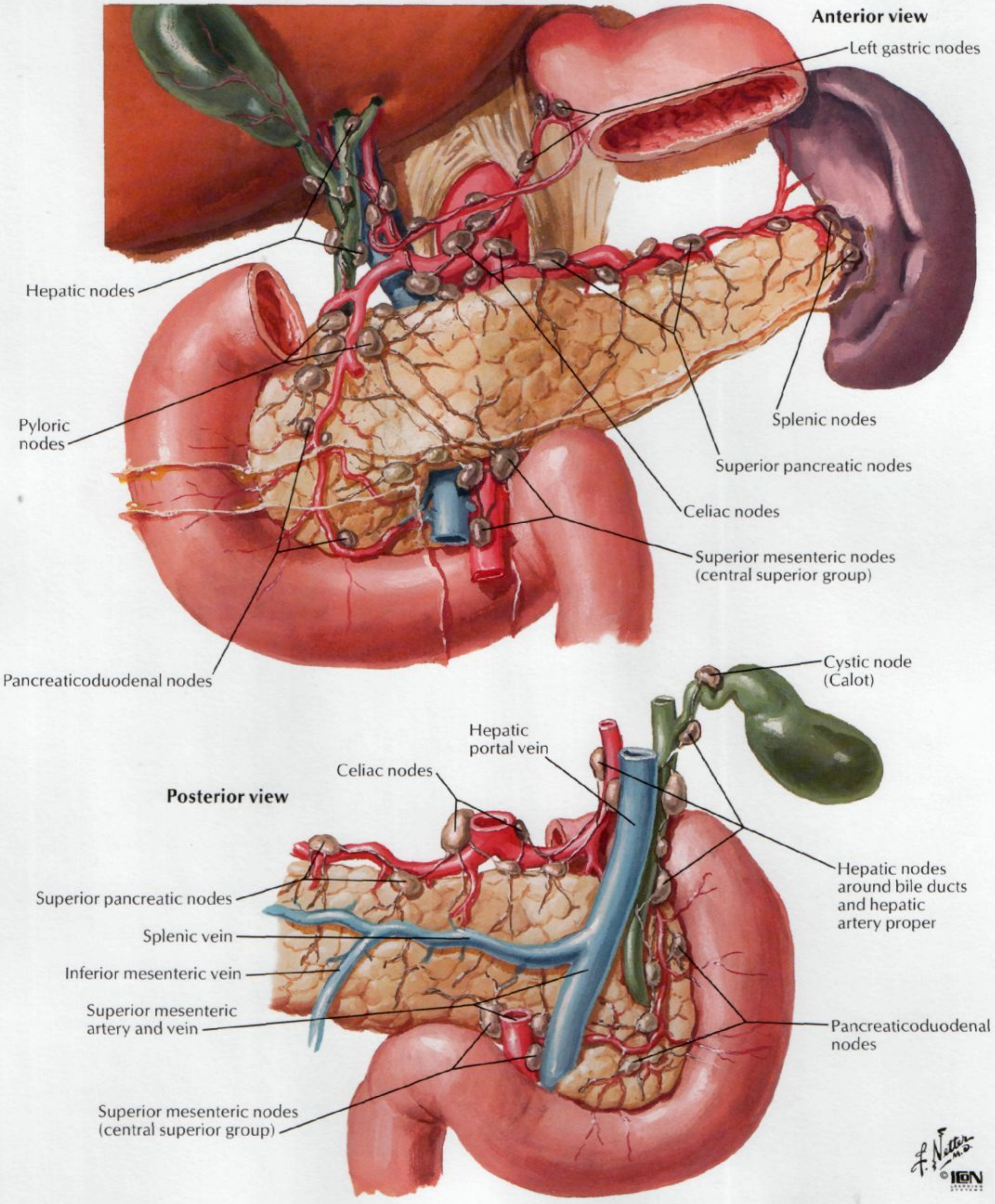
Lymph Vessels and Nodes of Large Intestine



Lymph Vessels and Nodes of Pancreas


Anterior view
Left gastric nodes
Hepatic nodes
Pyloric nodes
Splenic nodes
Superior pancreatic nodes
Celiac nodes
Superior mesenteric nodes (central superior group)
Pancreaticoduodenal nodes
Cystic node (Calot)
Hepatic portal vein
Celiac nodes
Posterior view
Superior pancreatic nodes
Splenic vein
Inferior mesenteric vein
Superior mesenteric artery and vein
Superior mesenteric nodes (central superior group)
Hepatic nodes around bile ducts and hepatic artery proper
Pancreaticoduodenal nodes
F. Netter M.D.
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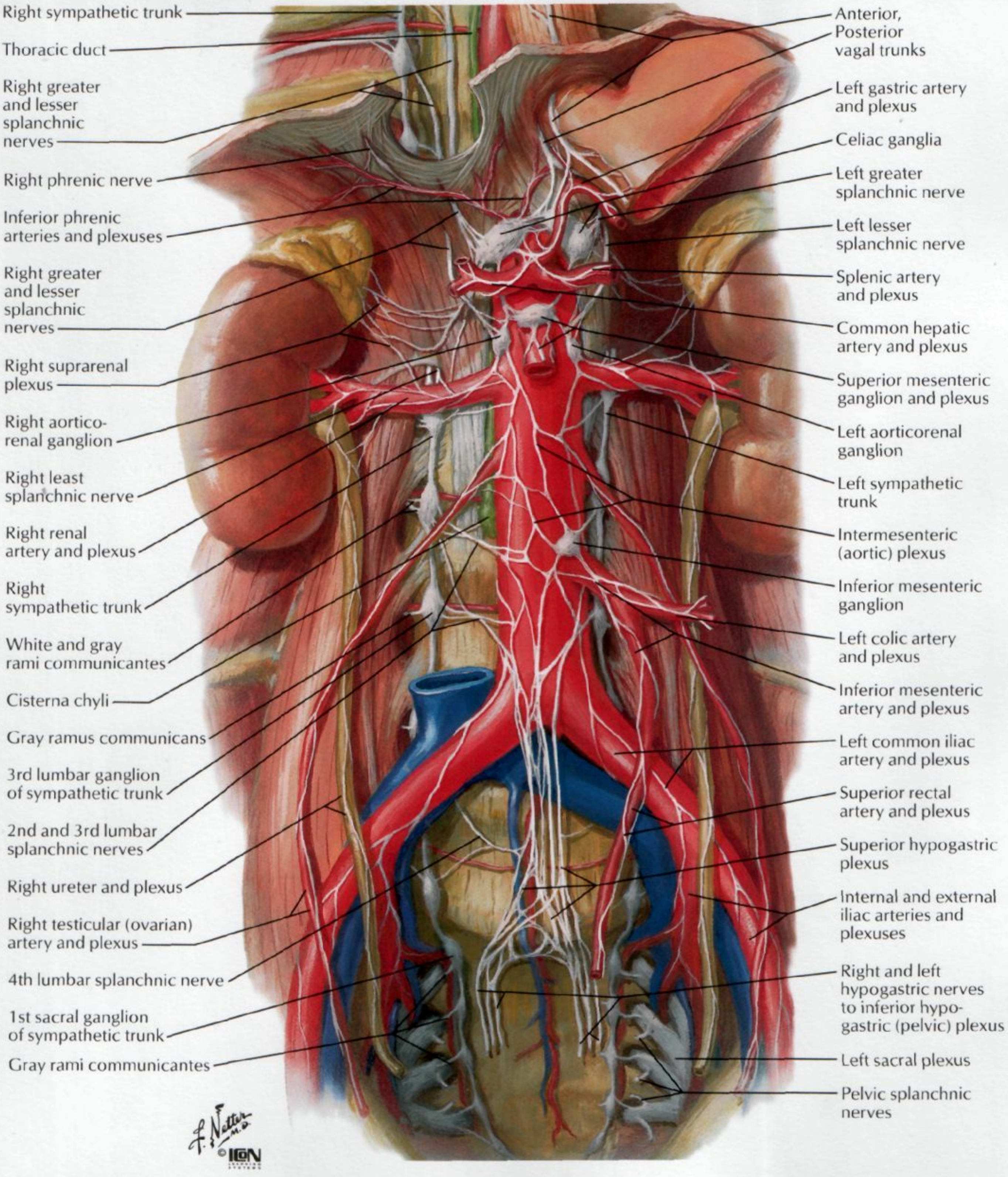
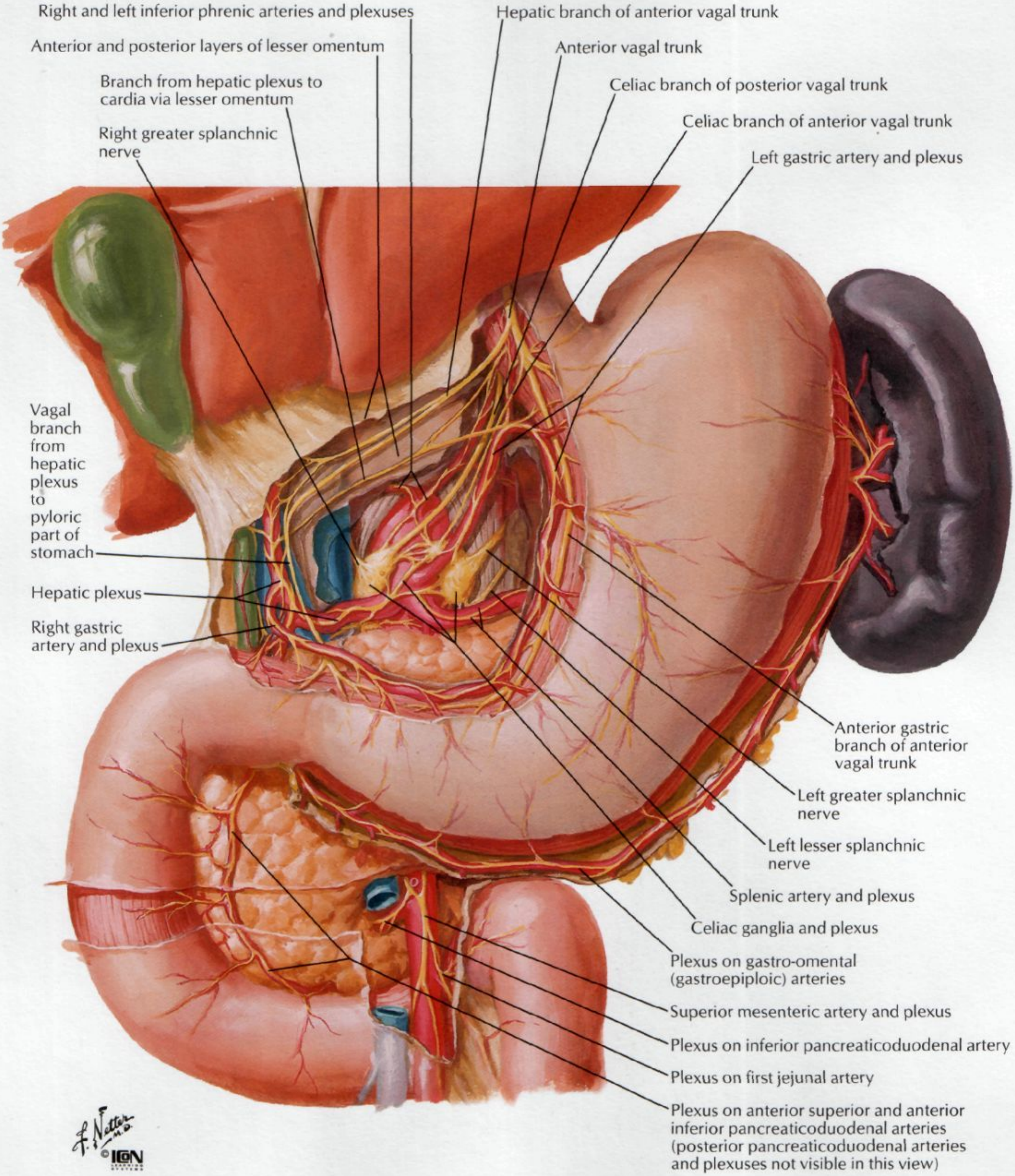
Autonomic Nerves and Ganglia of Abdomen

SEE ALSO PLATE 159


Right sympathetic trunk
Thoracic duct
Right greater and lesser splanchnic nerves
Right phrenic nerve
Inferior phrenic arteries and plexuses
Right greater and lesser splanchnic nerves
Right suprarenal plexus
Right aortico-renal ganglion
Right least splanchnic nerve
Right renal artery and plexus
Right sympathetic trunk
White and gray rami communicantes
Cisterna chyli
Gray ramus communicans
3rd lumbar ganglion of sympathetic trunk
2nd and 3rd lumbar splanchnic nerves
Right ureter and plexus
Right testicular (ovarian) artery and plexus
4th lumbar splanchnic nerve
1st sacral ganglion of sympathetic trunk
Gray rami communicantes
Anterior, Posterior vagal trunks
Left gastric artery and plexus
Celiac ganglia
Left greater splanchnic nerve
Left lesser splanchnic nerve
Splenic artery and plexus
Common hepatic artery and plexus
Superior mesenteric ganglion and plexus
Left aorticorenal ganglion
Left sympathetic trunk
Intermesenteric (aortic) plexus
Inferior mesenteric ganglion
Left colic artery and plexus
Inferior mesenteric artery and plexus
Left common iliac artery and plexus
Superior rectal artery and plexus
Superior hypogastric plexus
Internal and external iliac arteries and plexuses
Right and left hypogastric nerves to inferior hypogastric (pelvic) plexus
Left sacral plexus
Pelvic splanchnic nerves
F. Netter M.D.
© ICON

Nerves of Stomach and Duodenum

SEE ALSO PLATE 159


Right and left inferior phrenic arteries and plexuses
Anterior and posterior layers of lesser omentum
Branch from hepatic plexus to cardia via lesser omentum
Right greater splanchnic nerve
Hepatic branch of anterior vagal trunk
Anterior vagal trunk
Celiac branch of posterior vagal trunk
Celiac branch of anterior vagal trunk
Left gastric artery and plexus
Vagal branch from hepatic plexus to pyloric part of stomach
Hepatic plexus
Right gastric artery and plexus
Anterior gastric branch of anterior vagal trunk
Left greater splanchnic nerve
Left lesser splanchnic nerve
Splenic artery and plexus
Celiac ganglia and plexus
Plexus on gastro-omental (gastroepiploic) arteries
Superior mesenteric artery and plexus
Plexus on inferior pancreaticoduodenal artery
Plexus on first jejunal artery
Plexus on anterior superior and anterior inferior pancreaticoduodenal arteries (posterior pancreaticoduodenal arteries and plexuses not visible in this view)
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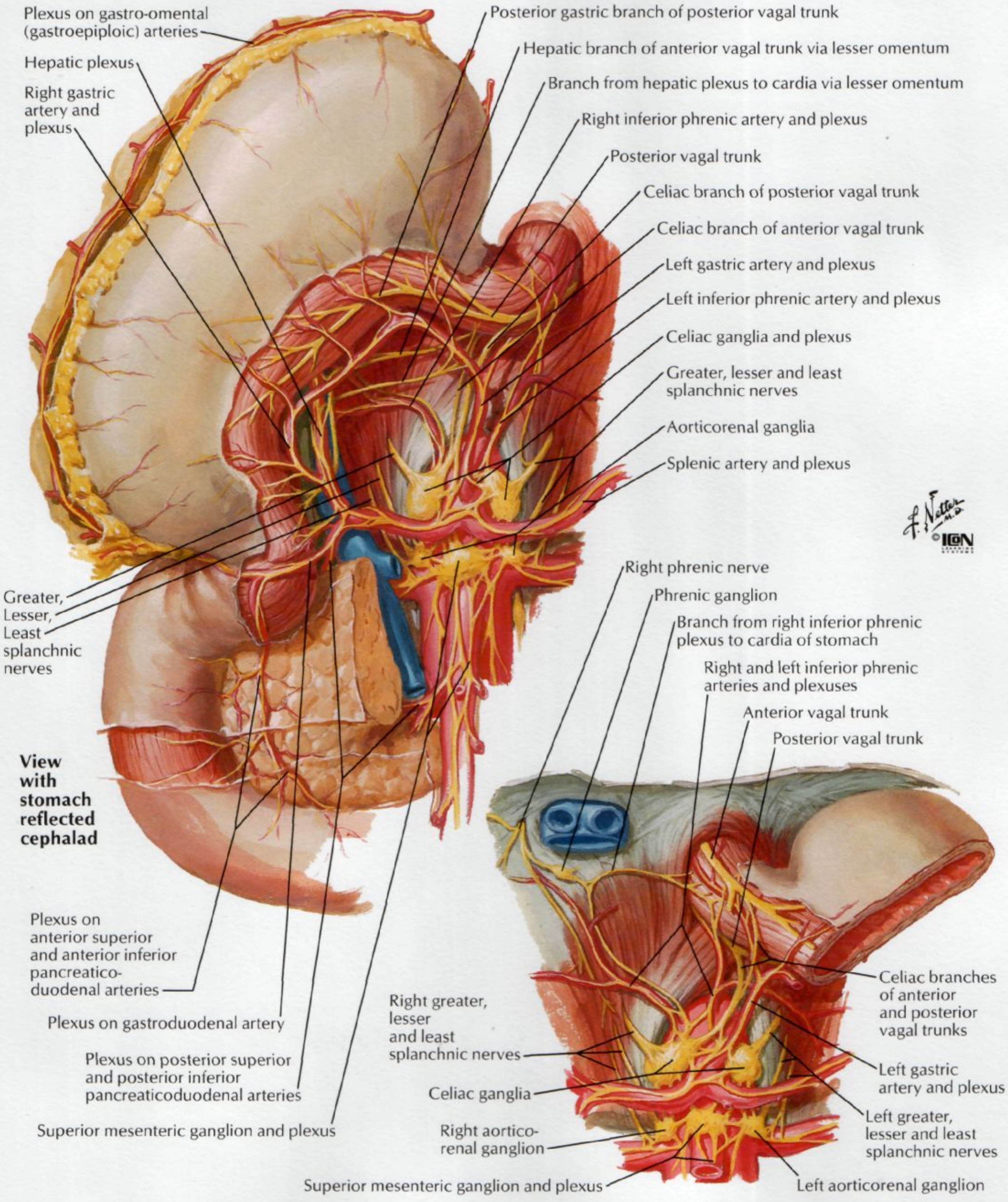
Nerves of Stomach and Duodenum (continued)

SEE ALSO PLATE 159


Plexus on gastro-omental (gastroepiploic) arteries
Hepatic plexus
Right gastric artery and plexus
Posterior gastric branch of posterior vagal trunk
Hepatic branch of anterior vagal trunk via lesser omentum
Branch from hepatic plexus to cardia via lesser omentum
Right inferior phrenic artery and plexus
Posterior vagal trunk
Celiac branch of posterior vagal trunk
Celiac branch of anterior vagal trunk
Left gastric artery and plexus
Left inferior phrenic artery and plexus
Celiac ganglia and plexus
Greater, lesser and least splanchnic nerves
Aorticorenal ganglia
Splenic artery and plexus
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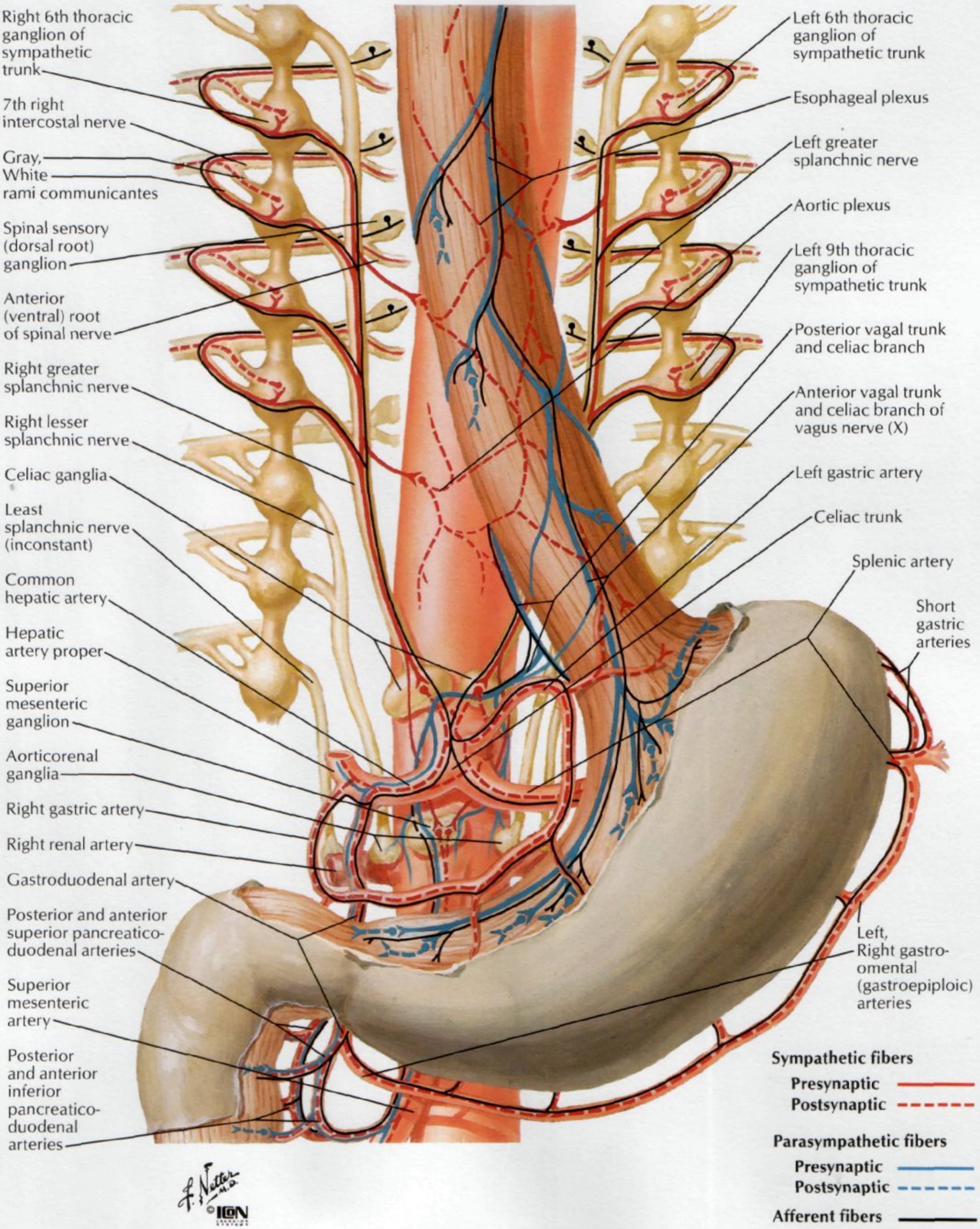
Greater, Lesser, Least splanchnic nerves
View with stomach reflected cephalad
Plexus on anterior superior and anterior inferior pancreaticoduodenal arteries
Plexus on gastroduodenal artery
Plexus on posterior superior and posterior inferior pancreaticoduodenal arteries
Superior mesenteric ganglion and plexus
Right phrenic nerve
Phrenic ganglion
Branch from right inferior phrenic plexus to cardia of stomach
Right and left inferior phrenic arteries and plexuses
Anterior vagal trunk
Posterior vagal trunk
Celiac branches of anterior and posterior vagal trunks
Left gastric artery and plexus
Left greater, lesser and least splanchnic nerves
Left aorticorenal ganglion
Right greater, lesser and least splanchnic nerves
Celiac ganglia
Right aorticorenal ganglion
Superior mesenteric ganglion and plexus

Innervation of Stomach and Duodenum: Schema

SEE ALSO PLATE 160


Right 6th thoracic ganglion of sympathetic trunk
7th right intercostal nerve
Gray,
White
rami communicantes
Spinal sensory (dorsal root) ganglion
Anterior (ventral) root of spinal nerve
Right greater splanchnic nerve
Right lesser splanchnic nerve
Celiac ganglia
Least splanchnic nerve (inconstant)
Common hepatic artery
Hepatic artery proper
Superior mesenteric ganglion
Aorticorenal ganglia
Right gastric artery
Right renal artery
Gastroduodenal artery
Posterior and anterior superior pancreaticoduodenal arteries
Superior mesenteric artery
Posterior and anterior inferior pancreaticoduodenal arteries
Left 6th thoracic ganglion of sympathetic trunk
Esophageal plexus
Left greater splanchnic nerve
Aortic plexus
Left 9th thoracic ganglion of sympathetic trunk
Posterior vagal trunk and celiac branch
Anterior vagal trunk and celiac branch of vagus nerve (X)
Left gastric artery
Celiac trunk
Splenic artery
Short gastric arteries
Left,
Right gastro-omental (gastroepiploic) arteries
Sympathetic fibers
Presynaptic
Postsynaptic
Parasympathetic fibers
Presynaptic
Postsynaptic
Afferent fibers
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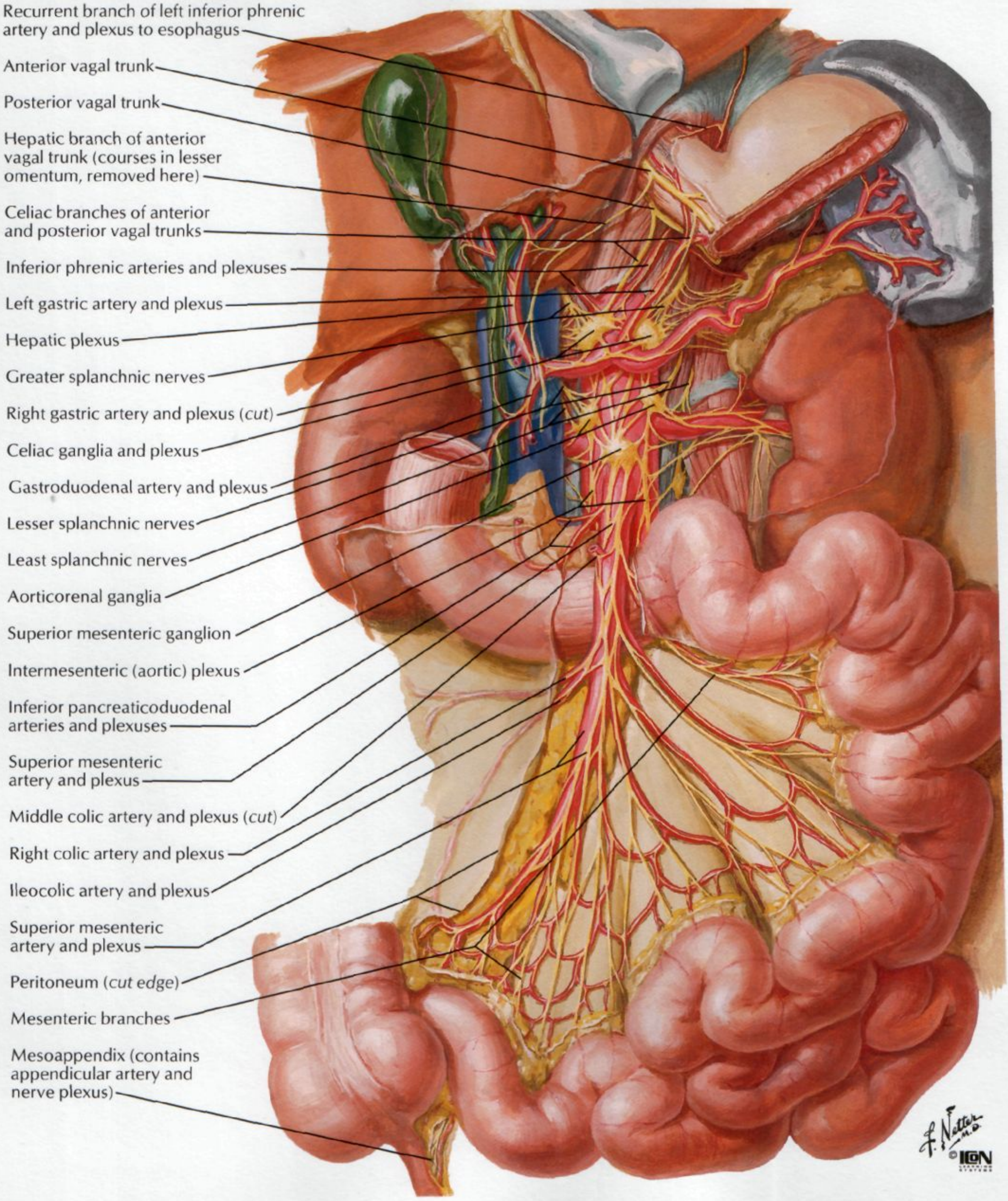
Nerves of Small Intestine

SEE ALSO PLATE 159


Recurrent branch of left inferior phrenic artery and plexus to esophagus
Anterior vagal trunk
Posterior vagal trunk
Hepatic branch of anterior vagal trunk (courses in lesser omentum, removed here)
Celiac branches of anterior and posterior vagal trunks
Inferior phrenic arteries and plexuses
Left gastric artery and plexus
Hepatic plexus
Greater splanchnic nerves
Right gastric artery and plexus (*cut*)
Celiac ganglia and plexus
Gastroduodenal artery and plexus
Lesser splanchnic nerves
Least splanchnic nerves
Aorticorenal ganglia
Superior mesenteric ganglion
Intermesenteric (aortic) plexus
Inferior pancreaticoduodenal arteries and plexuses
Superior mesenteric artery and plexus
Middle colic artery and plexus (*cut*)
Right colic artery and plexus
Ileocolic artery and plexus
Superior mesenteric artery and plexus
Peritoneum (*cut edge*)
Mesenteric branches
Mesoappendix (contains appendicular artery and nerve plexus)
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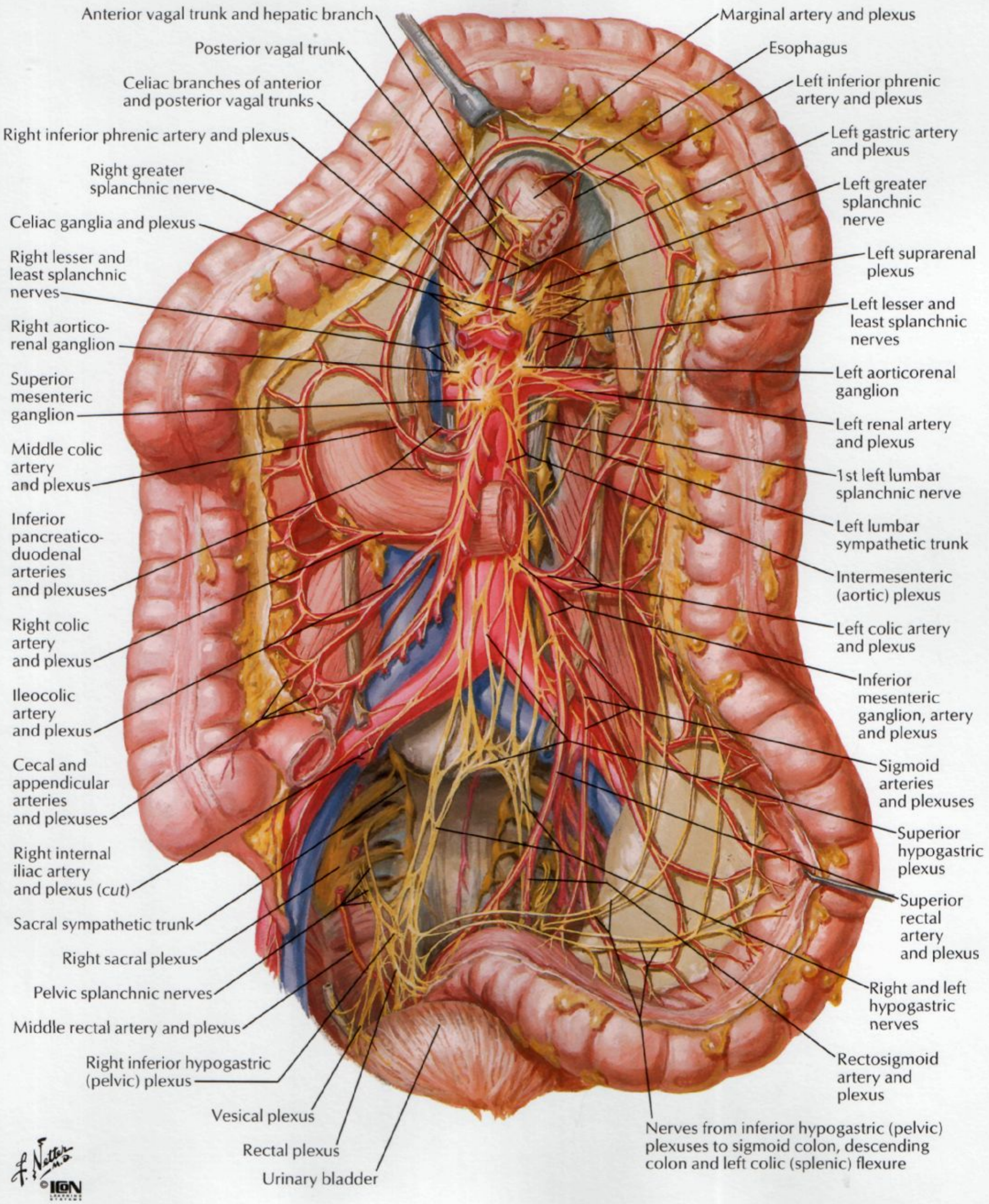
Nerves of Large Intestine

FOR NERVES OF RECTUM SEE PLATES 159, 390–393


Anterior vagal trunk and hepatic branch
Posterior vagal trunk
Celiac branches of anterior and posterior vagal trunks
Right inferior phrenic artery and plexus
Right greater splanchnic nerve
Celiac ganglia and plexus
Right lesser and least splanchnic nerves
Right aorticorenal ganglion
Superior mesenteric ganglion
Middle colic artery and plexus
Inferior pancreaticoduodenal arteries and plexuses
Right colic artery and plexus
Ileocolic artery and plexus
Cecal and appendicular arteries and plexuses
Right internal iliac artery and plexus (*cut*)
Sacral sympathetic trunk
Right sacral plexus
Pelvic splanchnic nerves
Middle rectal artery and plexus
Right inferior hypogastric (pelvic) plexus
Vesical plexus
Rectal plexus
Urinary bladder
Marginal artery and plexus
Esophagus
Left inferior phrenic artery and plexus
Left gastric artery and plexus
Left greater splanchnic nerve
Left suprarenal plexus
Left lesser and least splanchnic nerves
Left aorticorenal ganglion
Left renal artery and plexus
1st left lumbar splanchnic nerve
Left lumbar sympathetic trunk
Intermesenteric (aortic) plexus
Left colic artery and plexus
Inferior mesenteric ganglion, artery and plexus
Sigmoid arteries and plexuses
Superior hypogastric plexus
Superior rectal artery and plexus
Right and left hypogastric nerves
Rectosigmoid artery and plexus
Nerves from inferior hypogastric (pelvic) plexuses to sigmoid colon, descending colon and left colic (splenic) flexure
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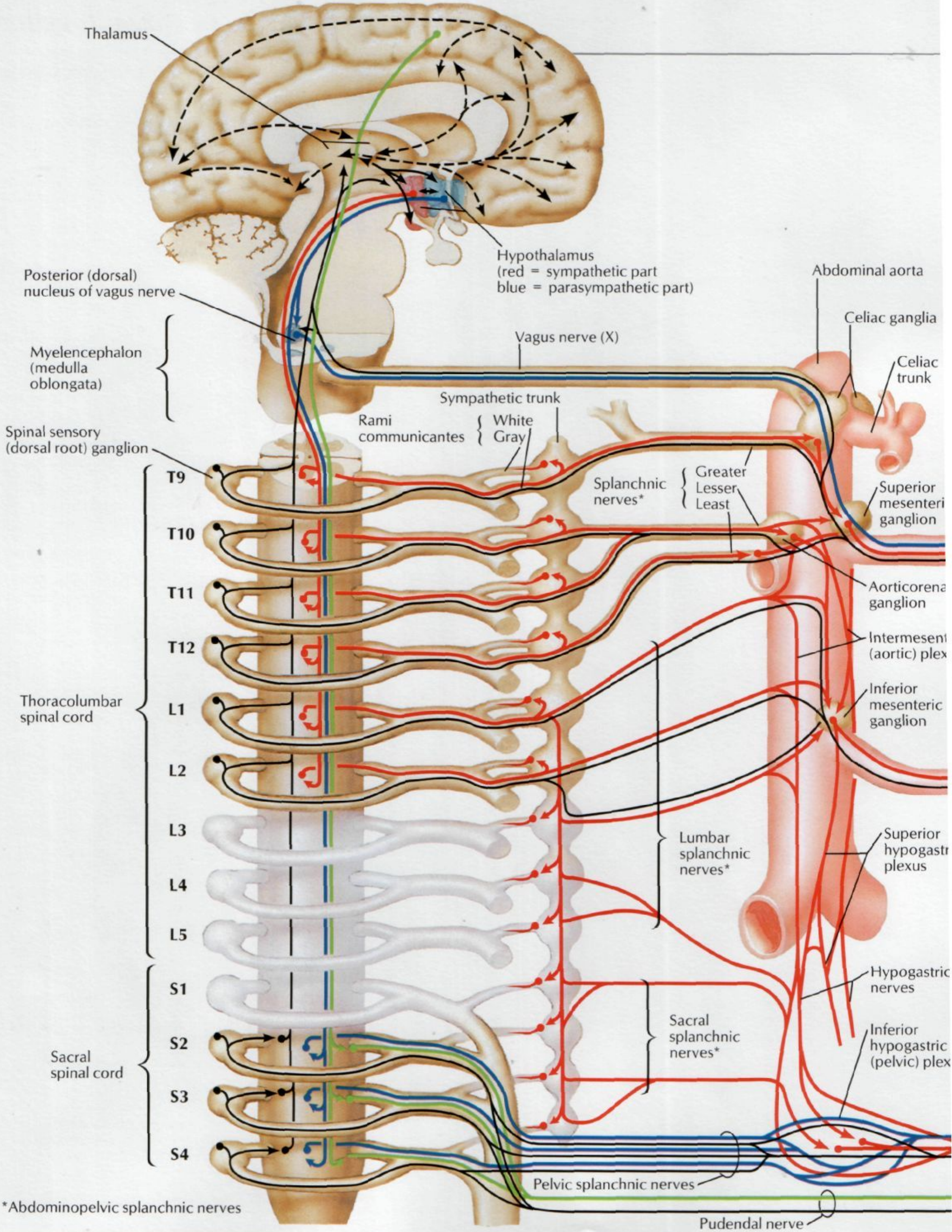
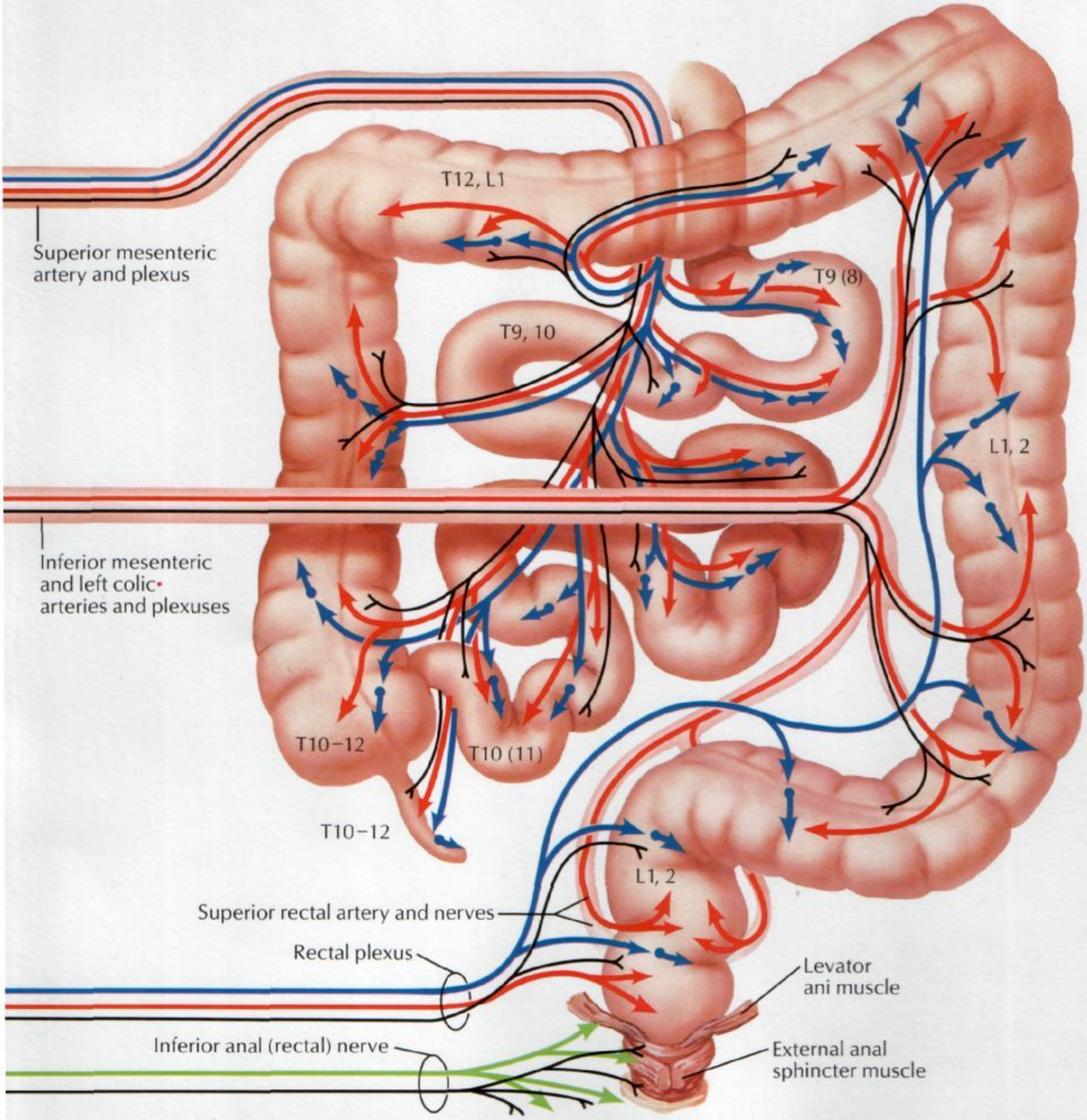


*Abdominopelvic splanchnic nerves

Innervation of Small and Large Intestines: Schema

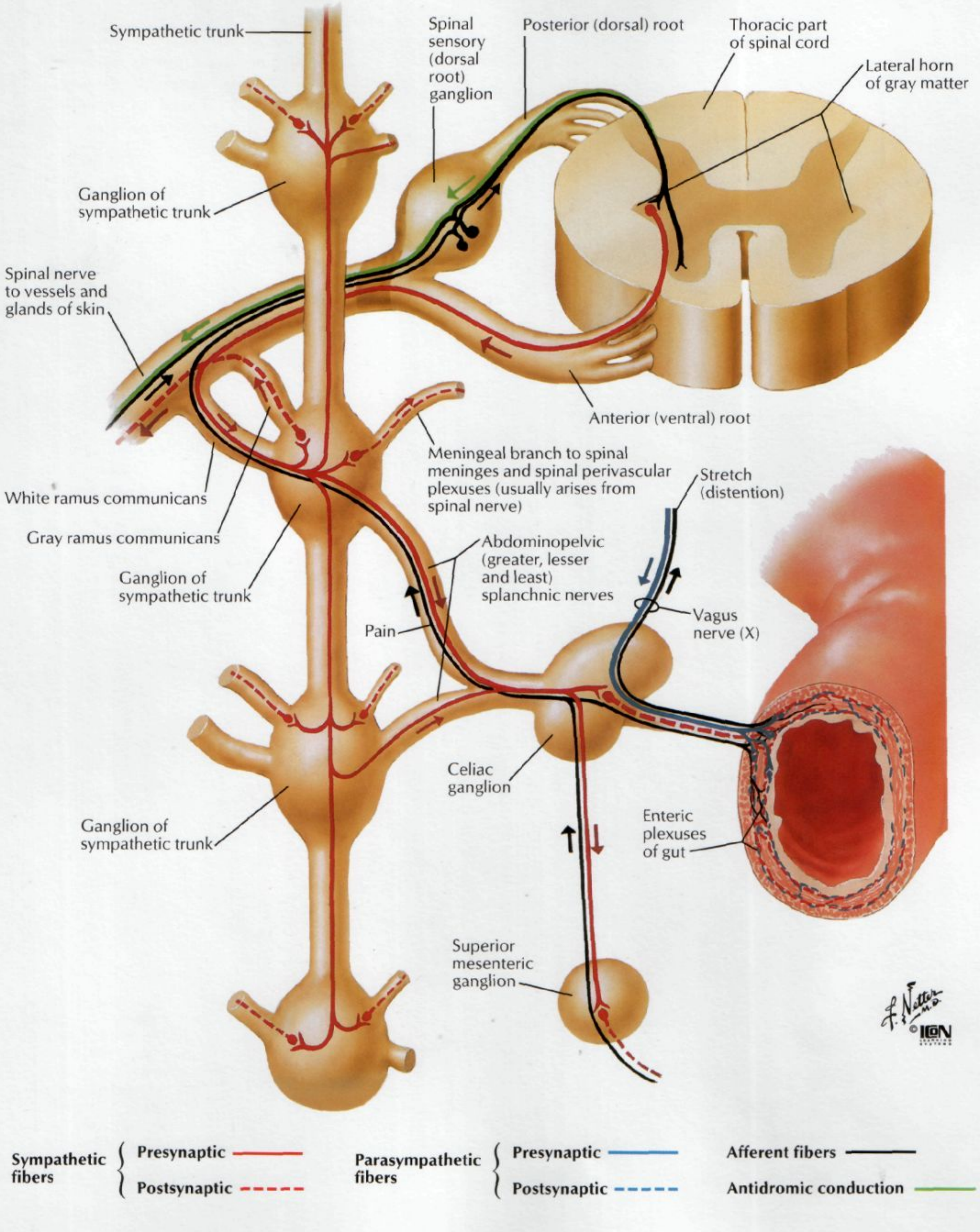
SEE ALSO PLATE 160

Sympathetic efferents 🟥
Parasympathetic efferents 🟦
Somatic efferents 🟩
Afferents and CNS connections —
Indefinite paths - - - - -


T12, L1
Superior mesenteric artery and plexus
T9 (8)
T9, 10
L1, 2
Inferior mesenteric and left colic arteries and plexuses
T10–12
T10 (11)
T10–12
L1, 2
Superior rectal artery and nerves
Rectal plexus
Levator ani muscle
Inferior anal (rectal) nerve
External anal sphincter muscle

Chief segmental sources of sympathetic fibers innervating different regions of intestinal tract are indicated. Numerous afferent fibers are carried centripetally through approximately the same sympathetic splanchnic nerves that transmit presynaptic fibers

Autonomic Reflex Pathways: Schema


Sympathetic trunk
Spinal sensory (dorsal root) ganglion
Posterior (dorsal) root
Thoracic part of spinal cord
Lateral horn of gray matter
Ganglion of sympathetic trunk
Spinal nerve to vessels and glands of skin
Anterior (ventral) root
Meningeal branch to spinal meninges and spinal perivascular plexuses (usually arises from spinal nerve)
Stretch (distention)
White ramus communicans
Gray ramus communicans
Ganglion of sympathetic trunk
Abdominopelvic (greater, lesser and least) splanchnic nerves
Vagus nerve (X)
Pain
Celiac ganglion
Ganglion of sympathetic trunk
Enteric plexuses of gut
Superior mesenteric ganglion
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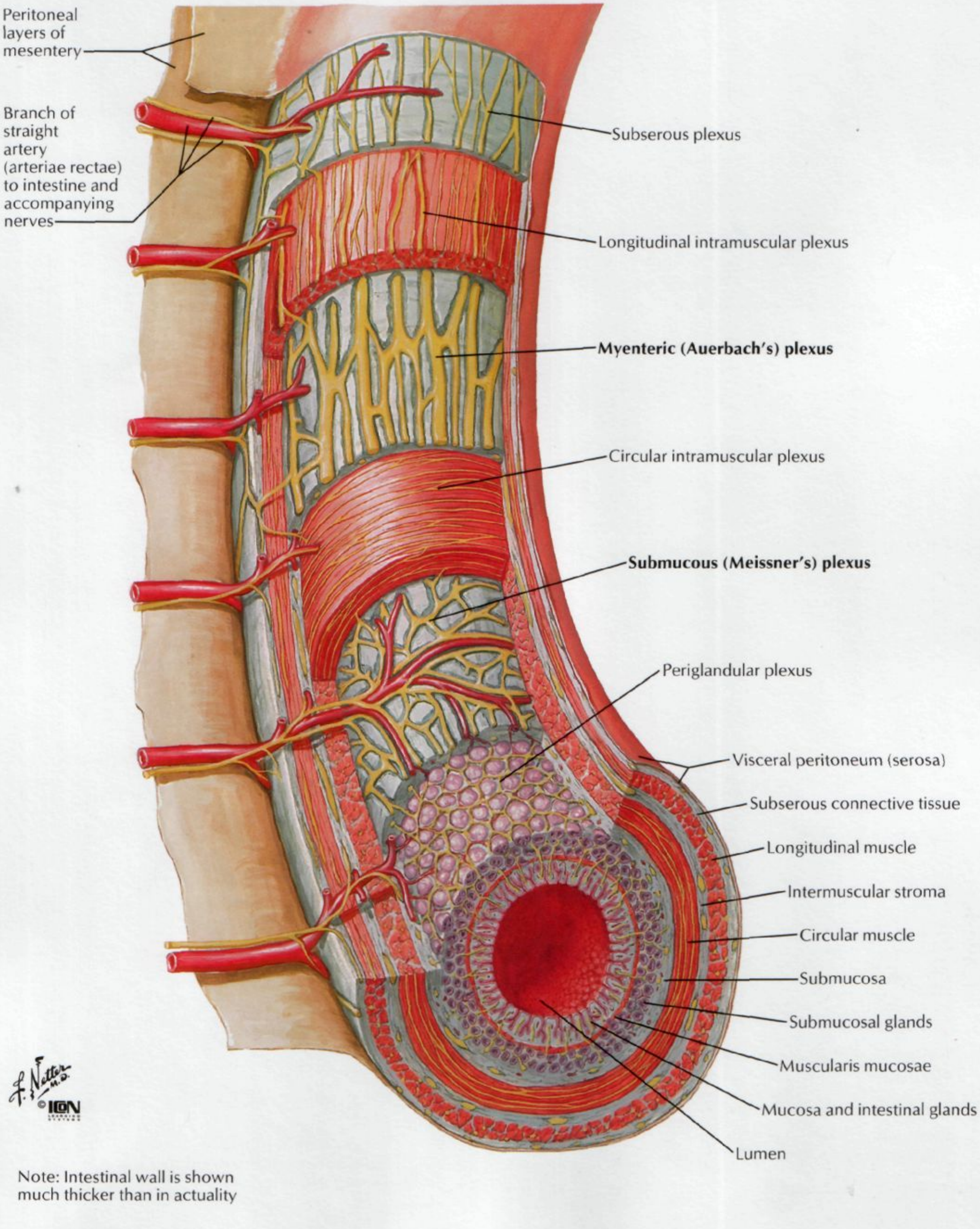
Sympathetic fibers
Presynaptic
Postsynaptic
Parasympathetic fibers
Presynaptic
Postsynaptic
Afferent fibers
Antidromic conduction

Intrinsic Autonomic Plexuses of Intestine: Schema


Peritoneal layers of mesentery
Branch of straight artery (arteriae rectae) to intestine and accompanying nerves
Subserous plexus
Longitudinal intramuscular plexus
Myenteric (Auerbach's) plexus
Circular intramuscular plexus
Submucous (Meissner's) plexus
Periglandular plexus
Visceral peritoneum (serosa)
Subserous connective tissue
Longitudinal muscle
Intermuscular stroma
Circular muscle
Submucosa
Submucosal glands
Muscularis mucosae
Mucosa and intestinal glands
Lumen
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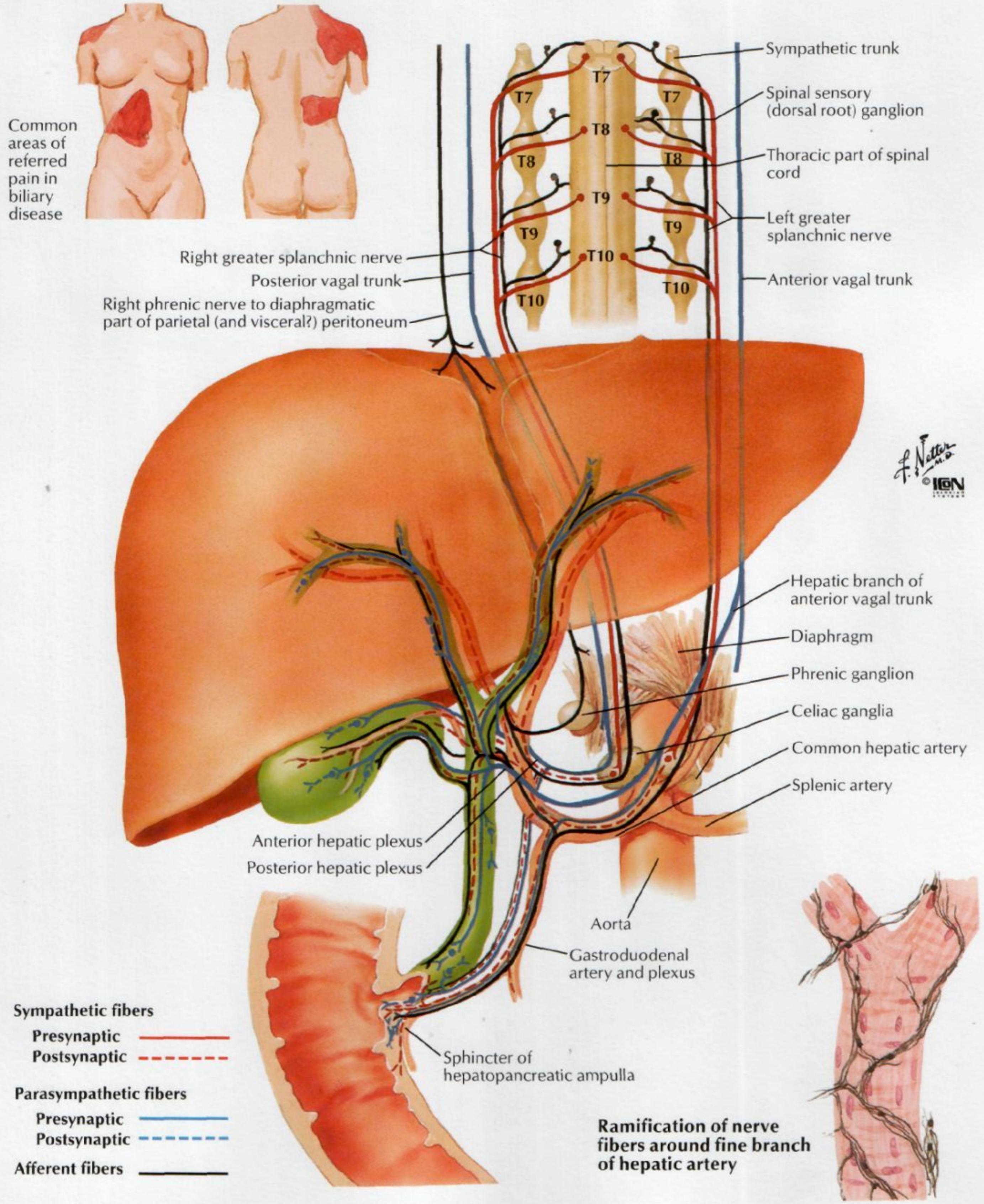
Note: Intestinal wall is shown much thicker than in actuality

Innervation of Liver and Biliary Tract: Schema

SEE ALSO PLATE 160


Common areas of referred pain in biliary disease
Sympathetic trunk
Spinal sensory (dorsal root) ganglion
Thoracic part of spinal cord
Left greater splanchnic nerve
Anterior vagal trunk
T7
T8
T9
T10
Right greater splanchnic nerve
Posterior vagal trunk
Right phrenic nerve to diaphragmatic part of parietal (and visceral?) peritoneum
Hepatic branch of anterior vagal trunk
Diaphragm
Phrenic ganglion
Celiac ganglia
Common hepatic artery
Splenic artery
Anterior hepatic plexus
Posterior hepatic plexus
Aorta
Gastroduodenal artery and plexus
Sphincter of hepatopancreatic ampulla
Ramification of nerve fibers around fine branch of hepatic artery
Sympathetic fibers
Presynaptic
Postsynaptic
Parasympathetic fibers
Presynaptic
Postsynaptic
Afferent fibers
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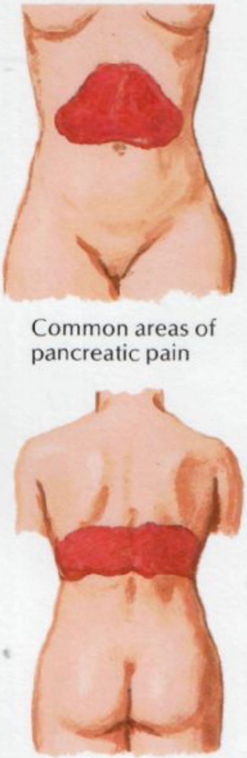
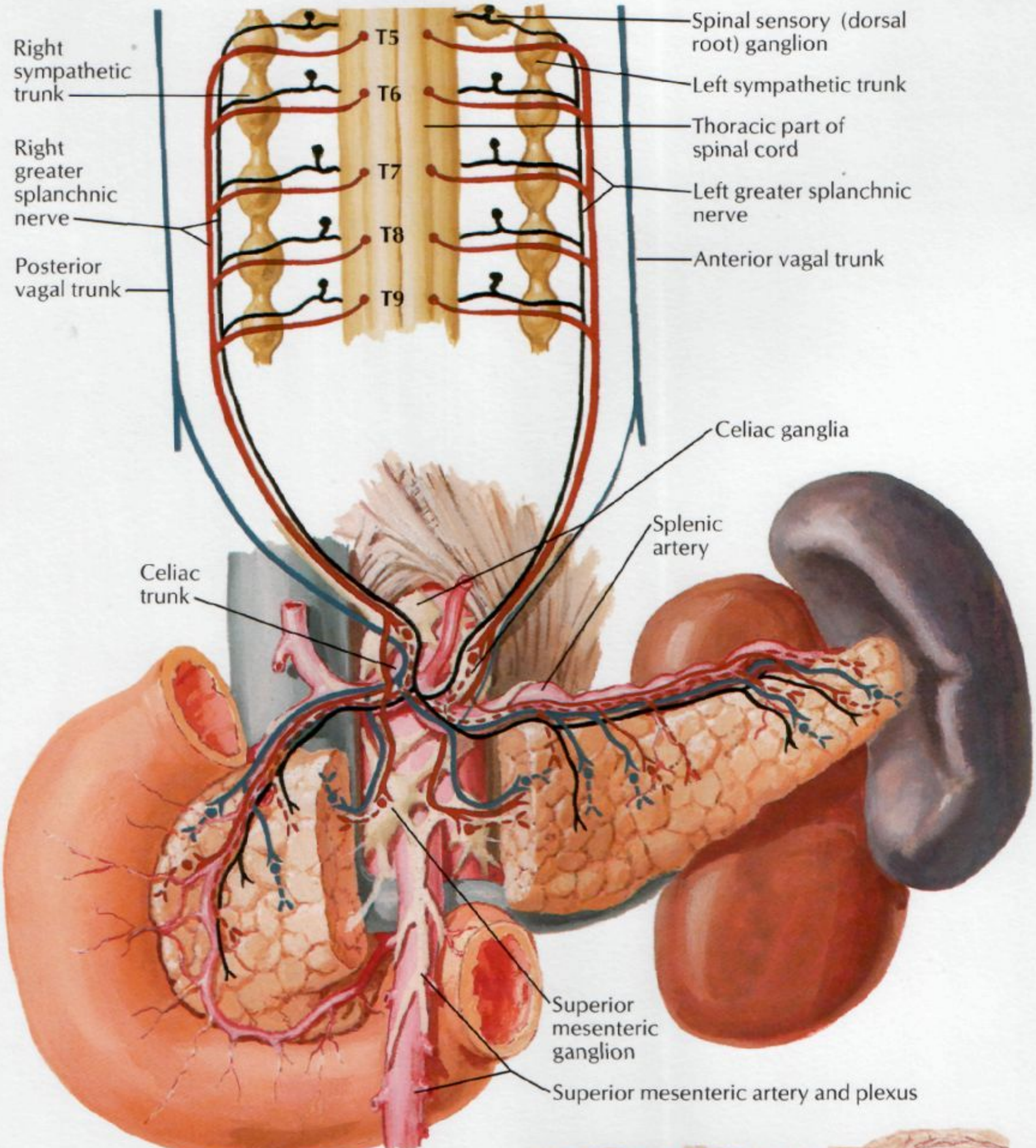
Innervation of Pancreas: Schema

SEE ALSO PLATE 160



Common areas of pancreatic pain


Right sympathetic trunk
Right greater splanchnic nerve
Posterior vagal trunk
T5
T6
T7
T8
T9
Spinal sensory (dorsal root) ganglion
Left sympathetic trunk
Thoracic part of spinal cord
Left greater splanchnic nerve
Anterior vagal trunk
Celiac ganglia
Splenic artery
Celiac trunk
Superior mesenteric ganglion
Superior mesenteric artery and plexus

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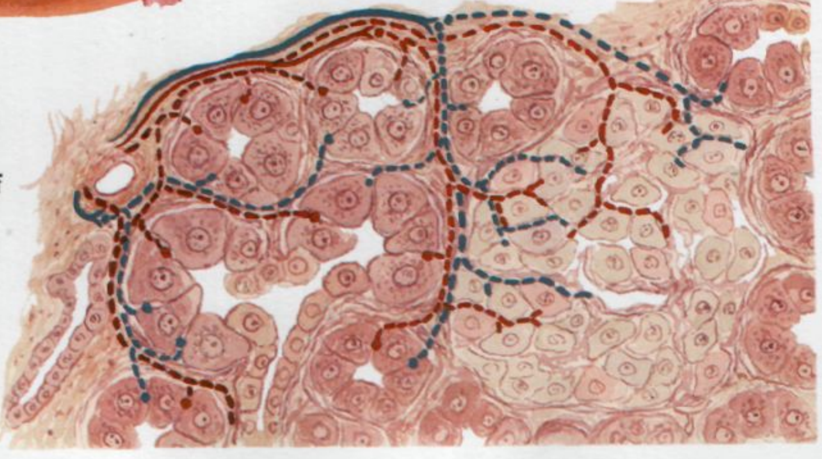


Schema of intrinsic nerve supply

Sympathetic fibers

Presynaptic ———

Postsynaptic - - - - - - -

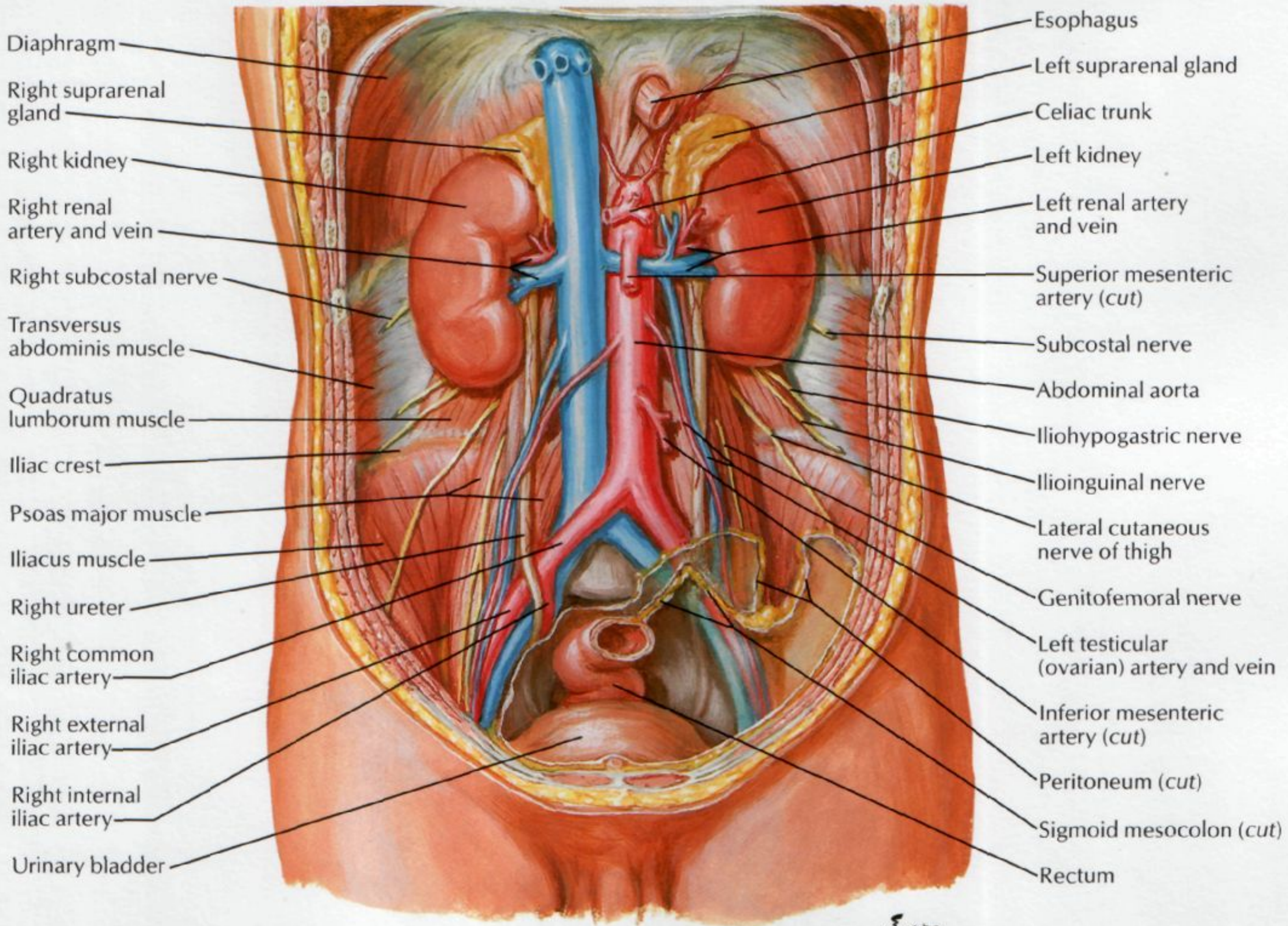
Parasympathetic fibers

Presynaptic ———

Postsynaptic - - - - - - -

Afferent fibers ———

Kidneys In Situ: Anterior Views


Diaphragm
Right suprarenal gland
Right kidney
Right renal artery and vein
Right subcostal nerve
Transversus abdominis muscle
Quadratus lumborum muscle
Iliac crest
Psoas major muscle
Iliacus muscle
Right ureter
Right common iliac artery
Right external iliac artery
Right internal iliac artery
Urinary bladder
Esophagus
Left suprarenal gland
Celiac trunk
Left kidney
Left renal artery and vein
Superior mesenteric artery (*cut*)
Subcostal nerve
Abdominal aorta
Iliohypogastric nerve
Ilioinguinal nerve
Lateral cutaneous nerve of thigh
Genitofemoral nerve
Left testicular (ovarian) artery and vein
Inferior mesenteric artery (*cut*)
Peritoneum (*cut*)
Sigmoid mesocolon (*cut*)
Rectum

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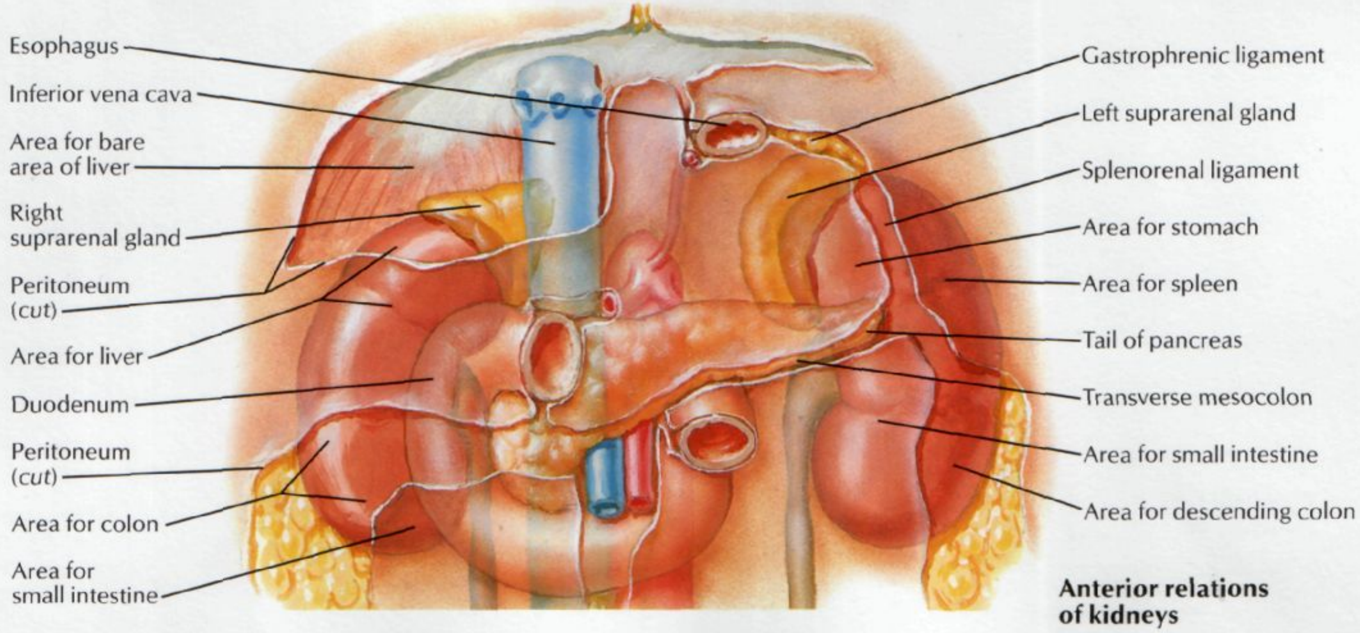
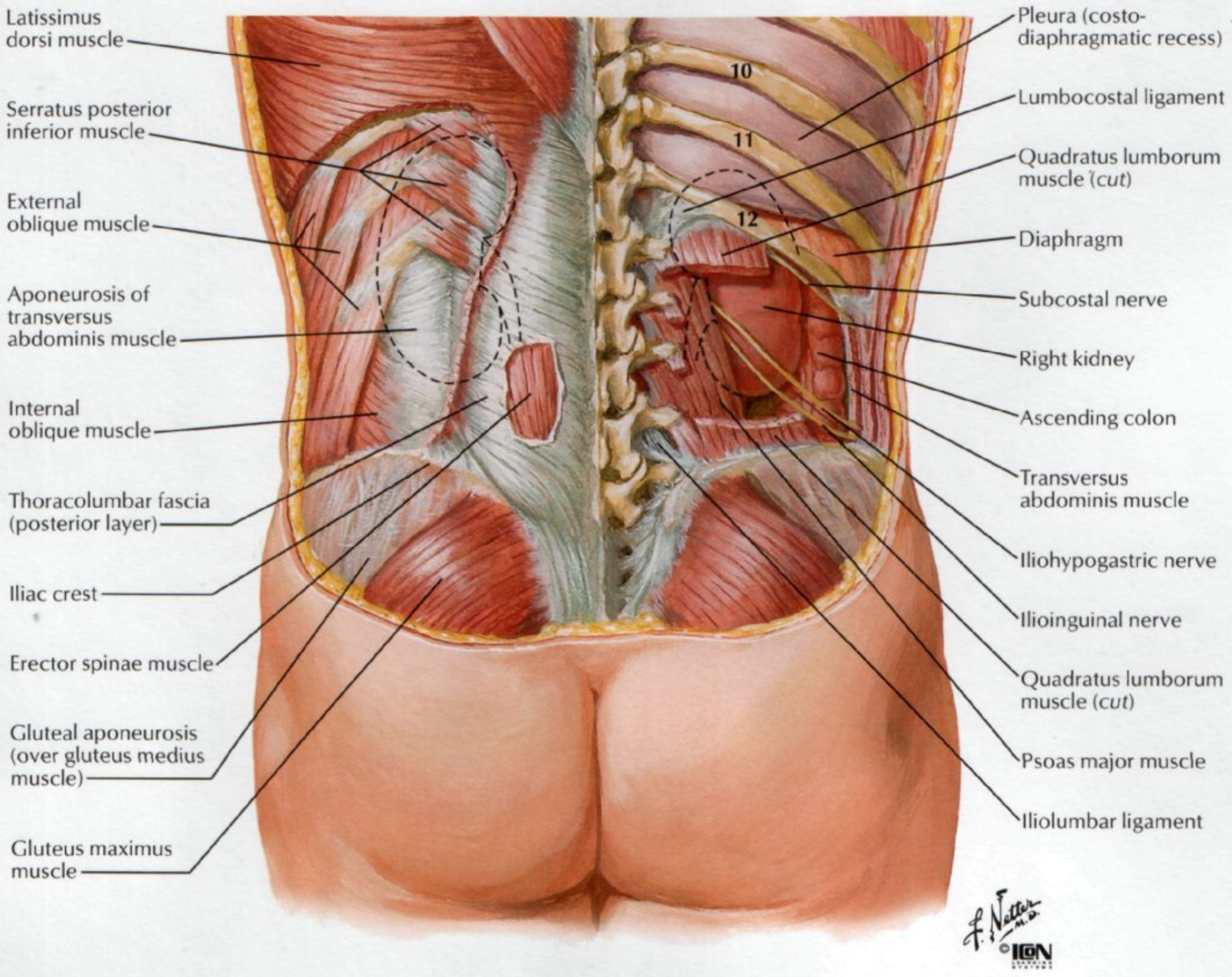
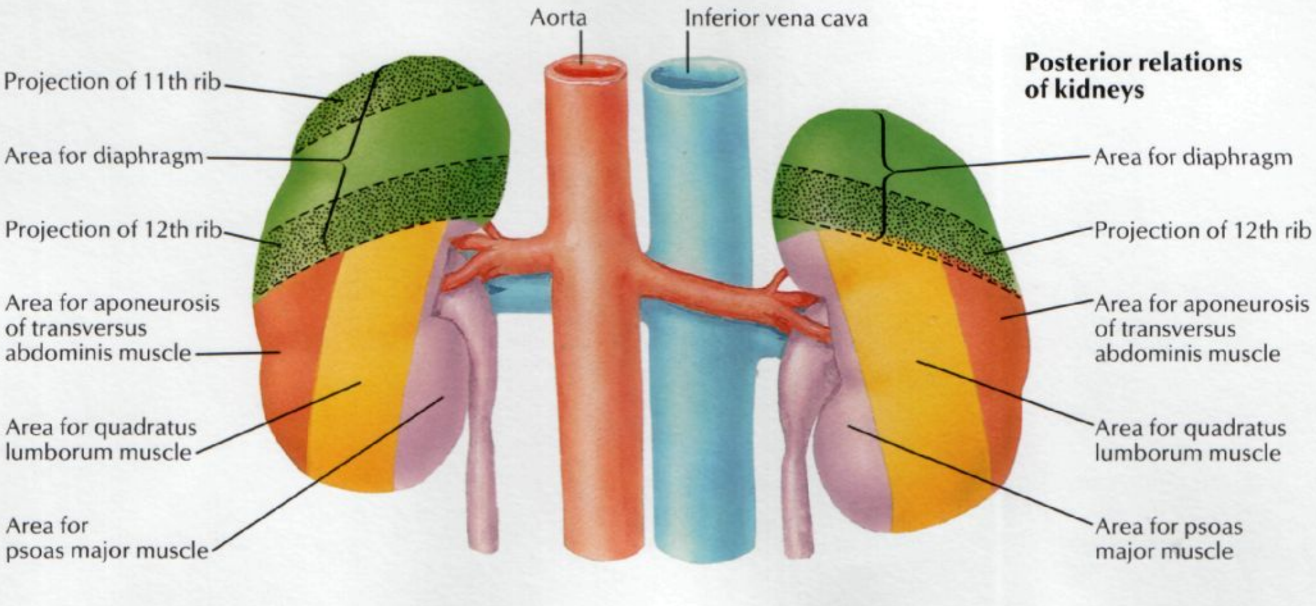


Anterior relations of kidneys

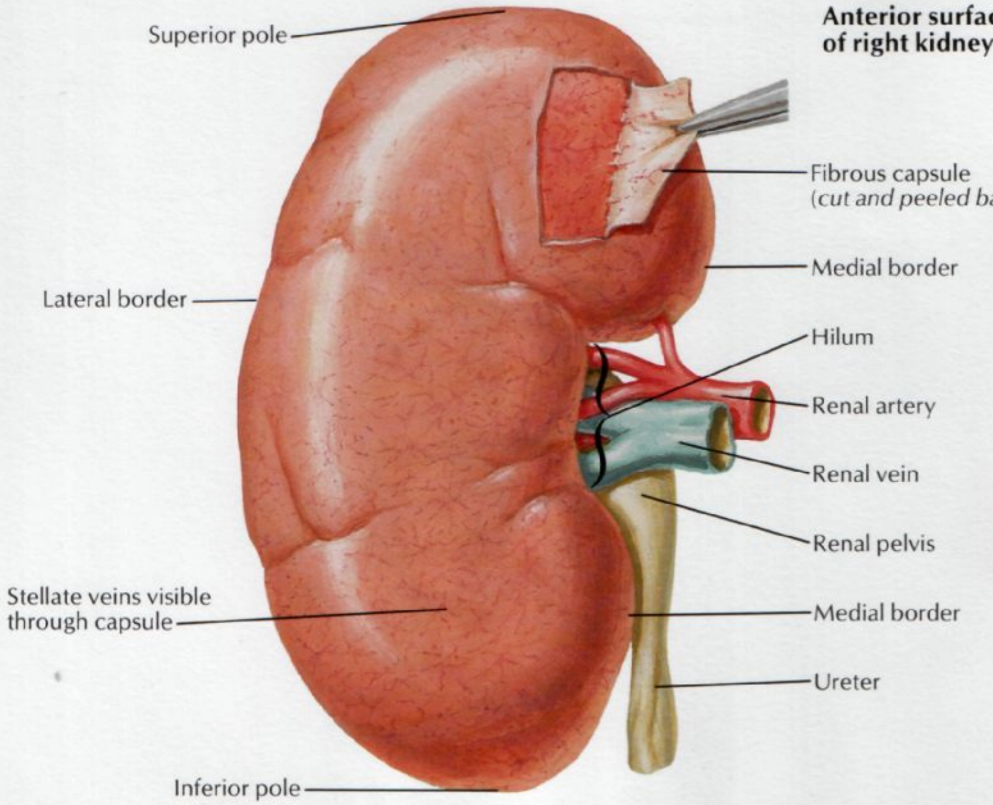
Kidneys In Situ: Posterior Views



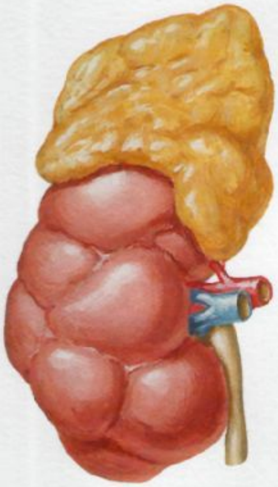

Aorta
Inferior vena cava
Projection of 11th rib
Area for diaphragm
Projection of 12th rib
Area for aponeurosis of transversus abdominis muscle
Area for quadratus lumborum muscle
Area for psoas major muscle
Area for diaphragm
Projection of 12th rib
Area for aponeurosis of transversus abdominis muscle
Area for quadratus lumborum muscle
Area for psoas major muscle

Posterior relations of kidneys

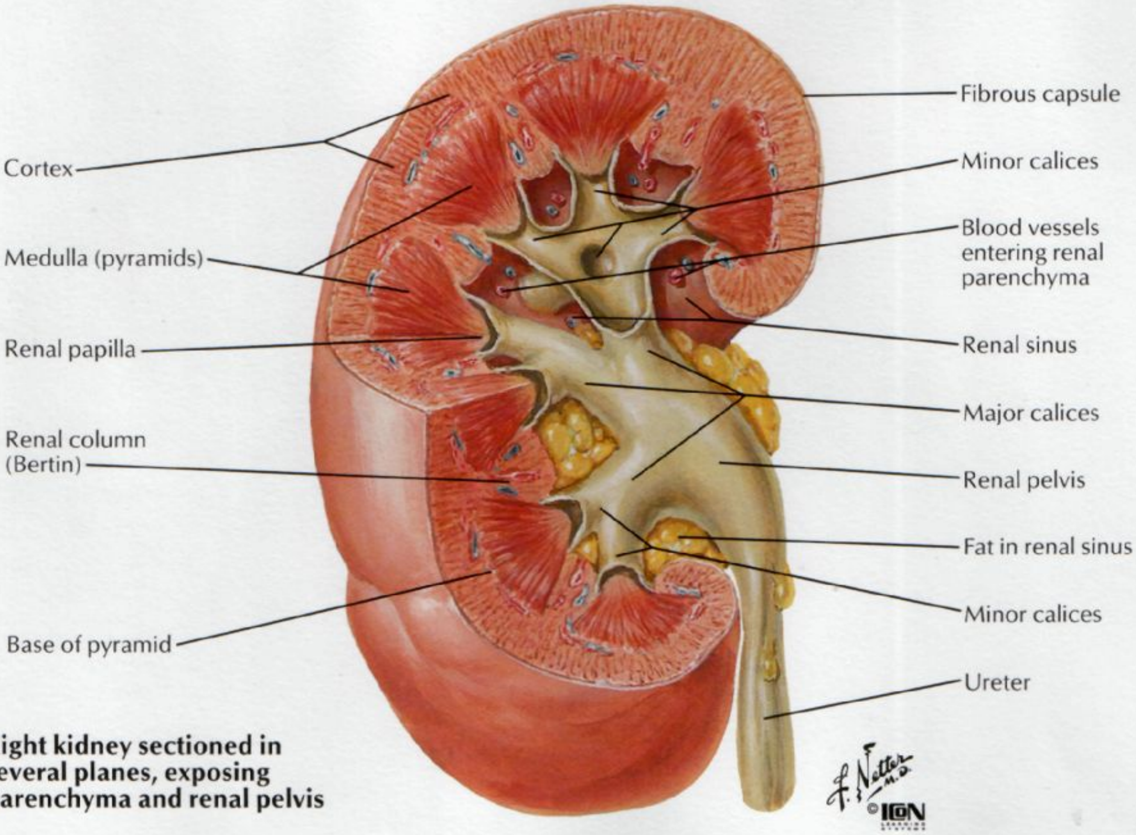
Gross Structure of Kidney



Anterior surface of right kidney

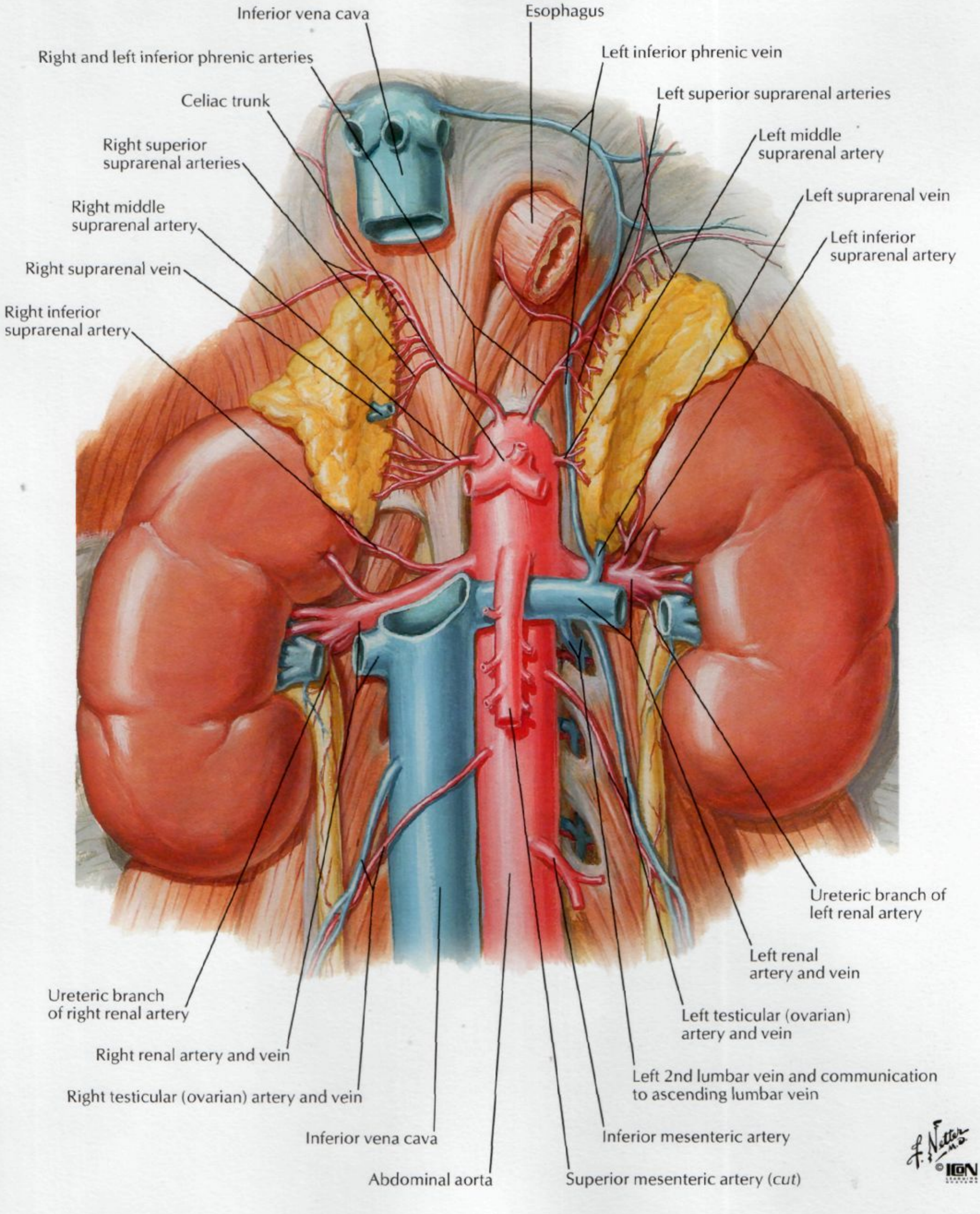


Suprarenal gland and lobulated kidney of infant



Right kidney sectioned in several planes, exposing parenchyma and renal pelvis

Renal Artery and Vein In Situ


Inferior vena cava
Esophagus
Right and left inferior phrenic arteries
Left inferior phrenic vein
Celiac trunk
Left superior suprarenal arteries
Right superior suprarenal arteries
Left middle suprarenal artery
Right middle suprarenal artery
Left suprarenal vein
Right suprarenal vein
Left inferior suprarenal artery
Right inferior suprarenal artery
Ureteric branch of left renal artery
Left renal artery and vein
Ureteric branch of right renal artery
Left testicular (ovarian) artery and vein
Right renal artery and vein
Left 2nd lumbar vein and communication to ascending lumbar vein
Right testicular (ovarian) artery and vein
Inferior vena cava
Inferior mesenteric artery
Abdominal aorta
Superior mesenteric artery (cut)
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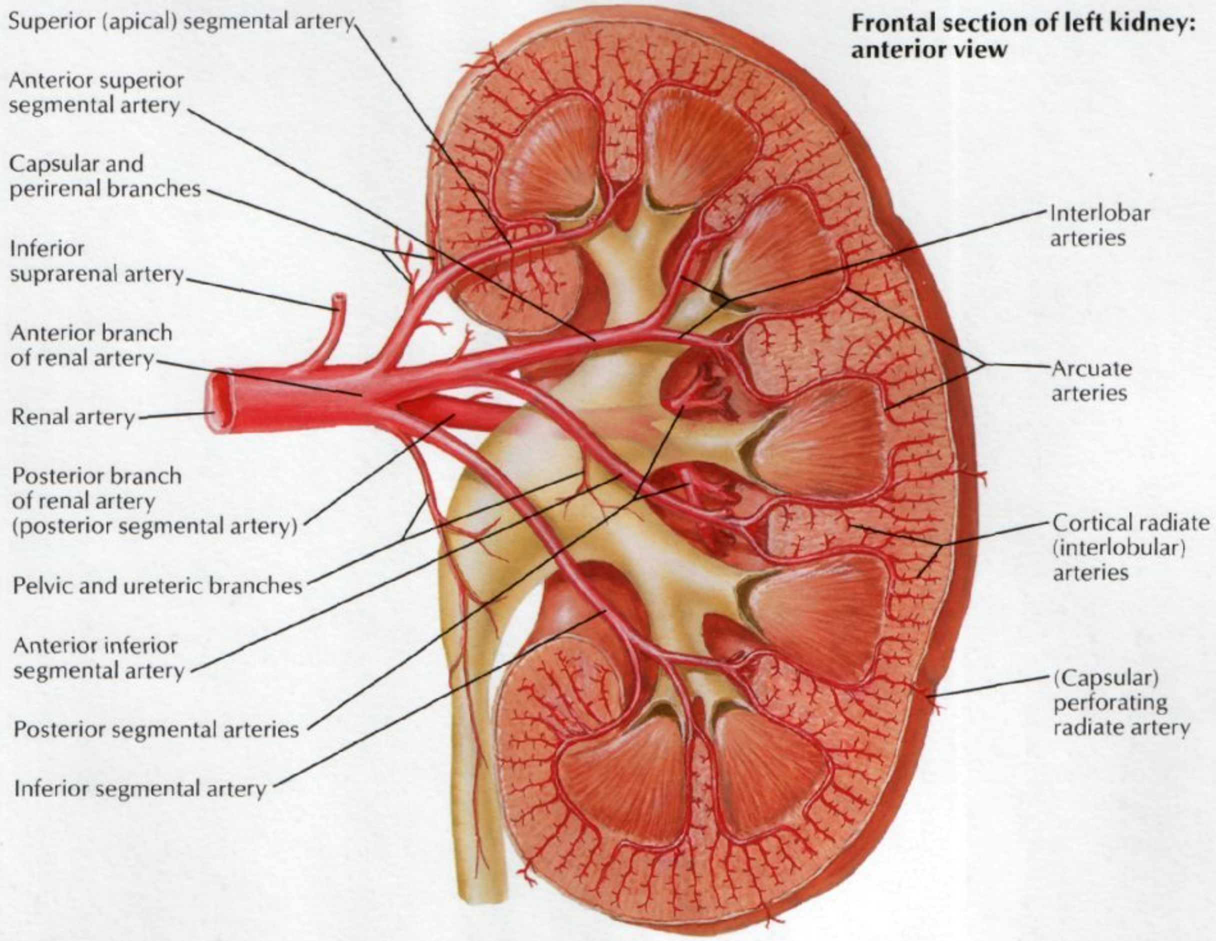
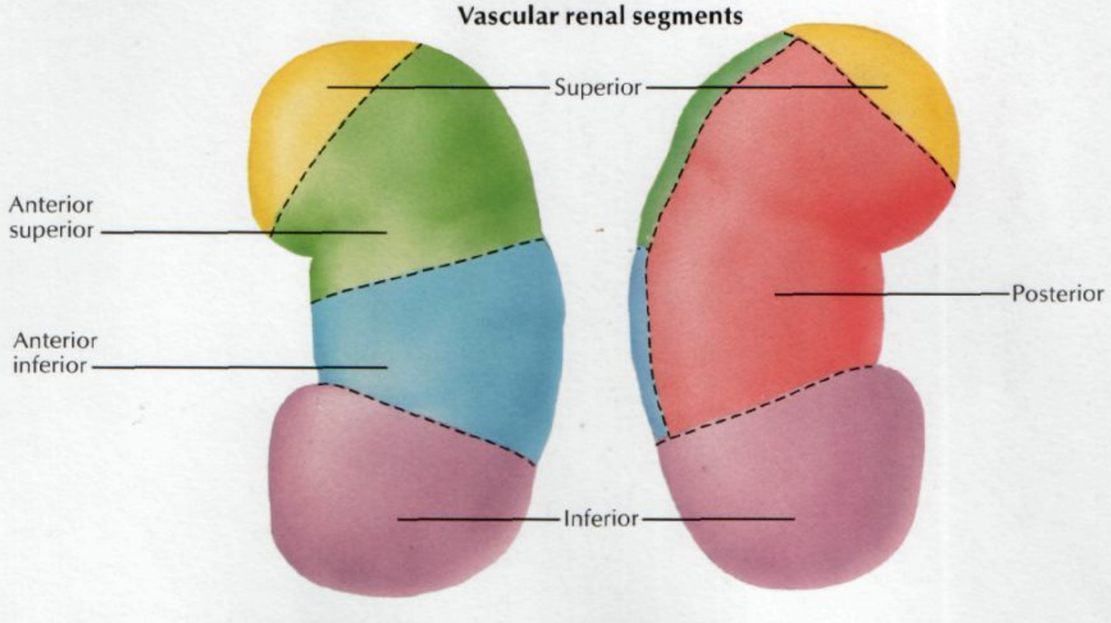
Intrarenal Arteries and Renal Segments

Frontal section of left kidney: anterior view


Superior (apical) segmental artery
Anterior superior segmental artery
Capsular and perirenal branches
Inferior suprarenal artery
Anterior branch of renal artery
Renal artery
Posterior branch of renal artery (posterior segmental artery)
Pelvic and ureteric branches
Anterior inferior segmental artery
Posterior segmental arteries
Inferior segmental artery
Interlobar arteries
Arcuate arteries
Cortical radiate (interlobular) arteries
(Capsular) perforating radiate artery

Vascular renal segments



Anterior surface of left kidney

Posterior surface of left kidney

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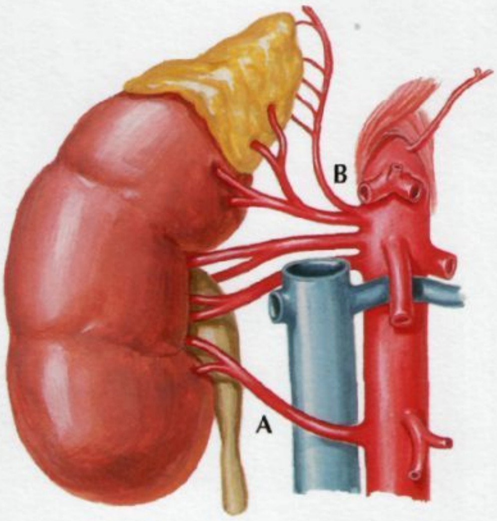
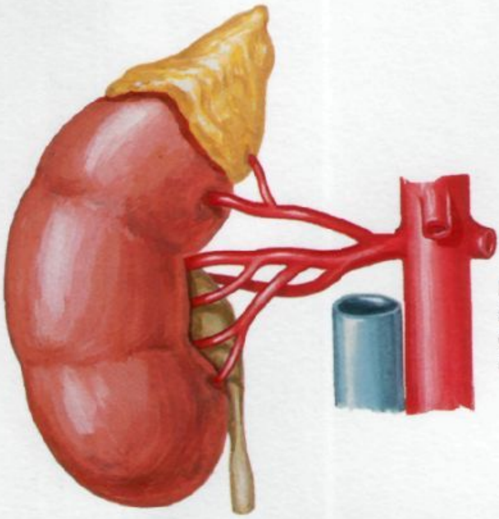
Variations in Renal Artery and Vein

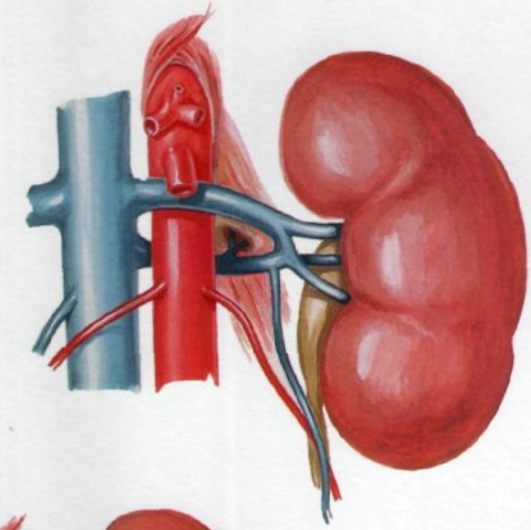


A Low accessory right renal artery may pass anterior to inferior vena cava instead of posterior to it

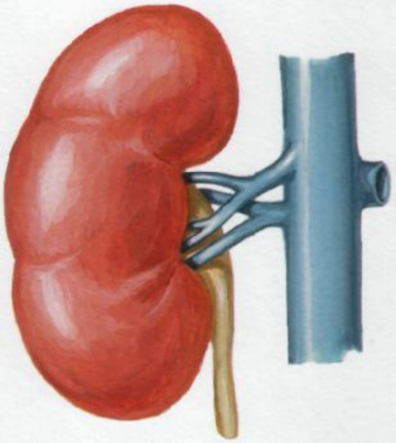
B Inferior phrenic artery with superior suprarenal arteries may arise from renal artery (middle suprarenal artery absent)



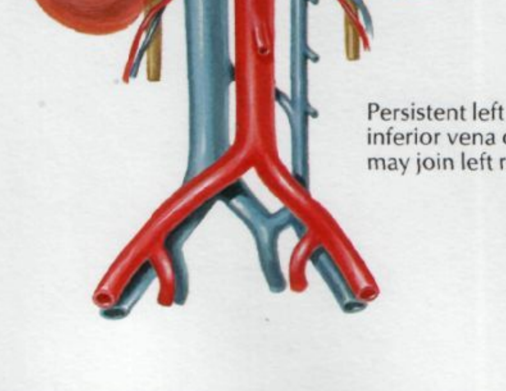
Proximal subdivision of renal artery



Double left renal vein may form ring around abdominal aorta



Multiple renal veins



Persistent left inferior vena cava may join left renal vein

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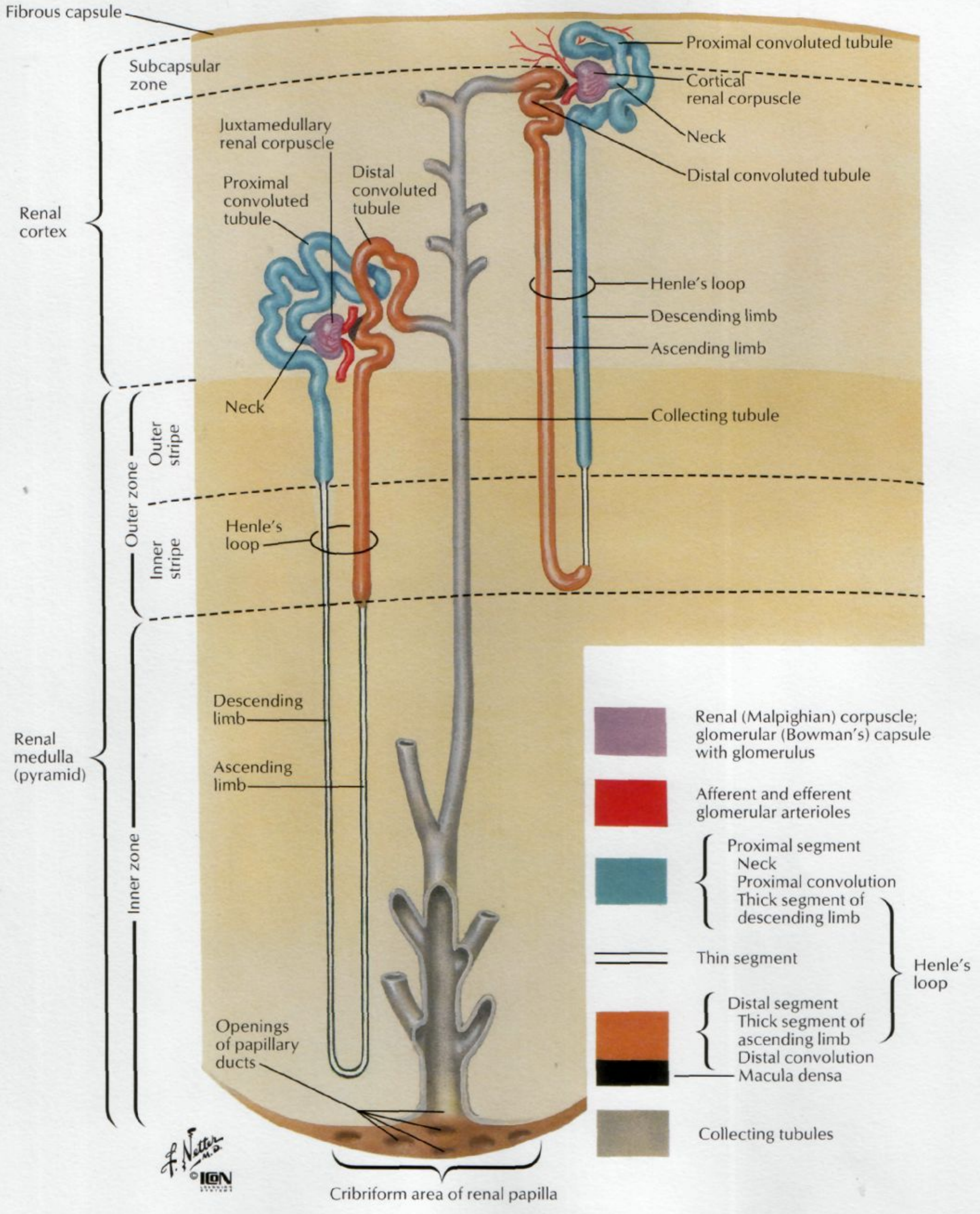
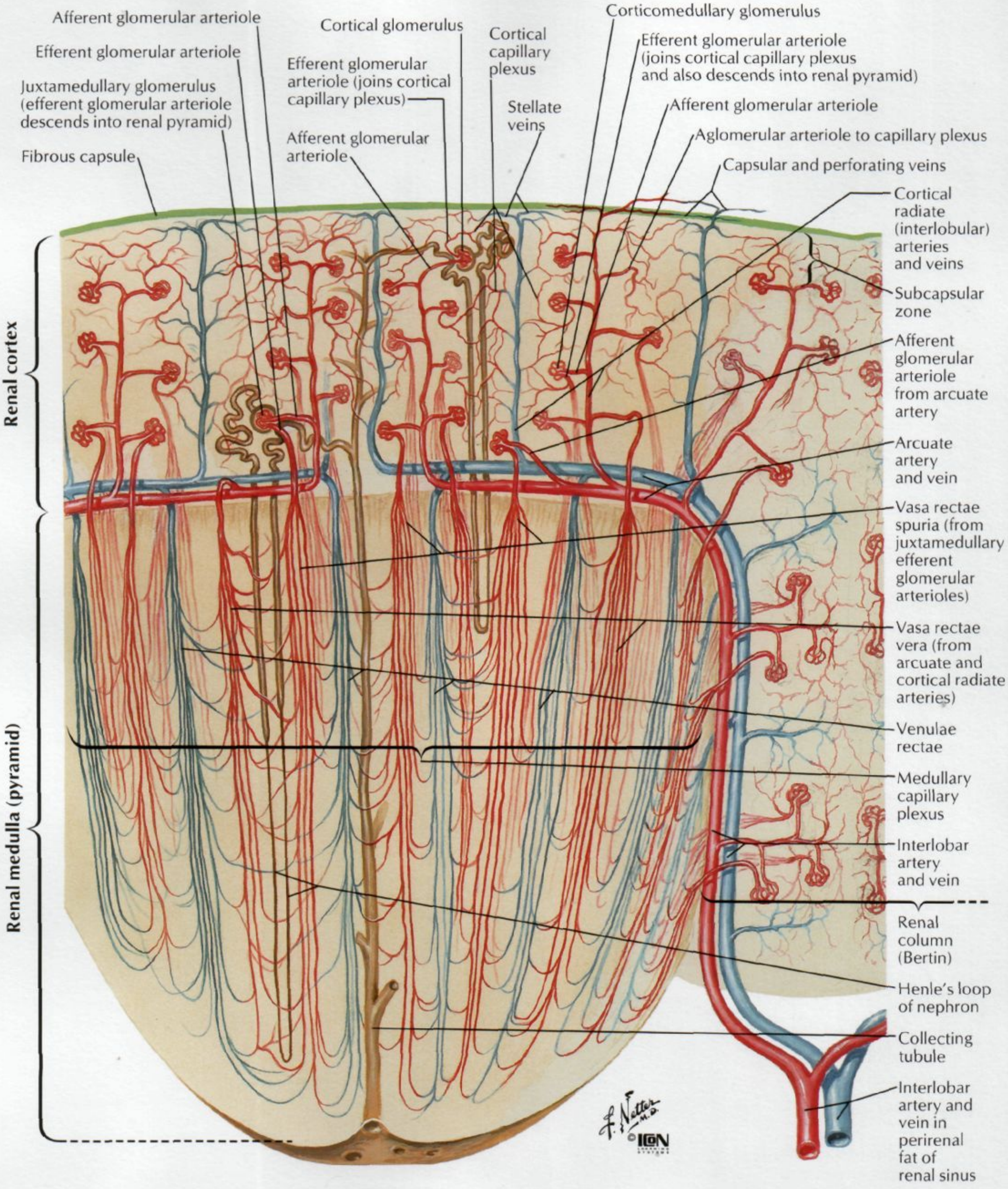
Nephron and Collecting Tubule: Schema



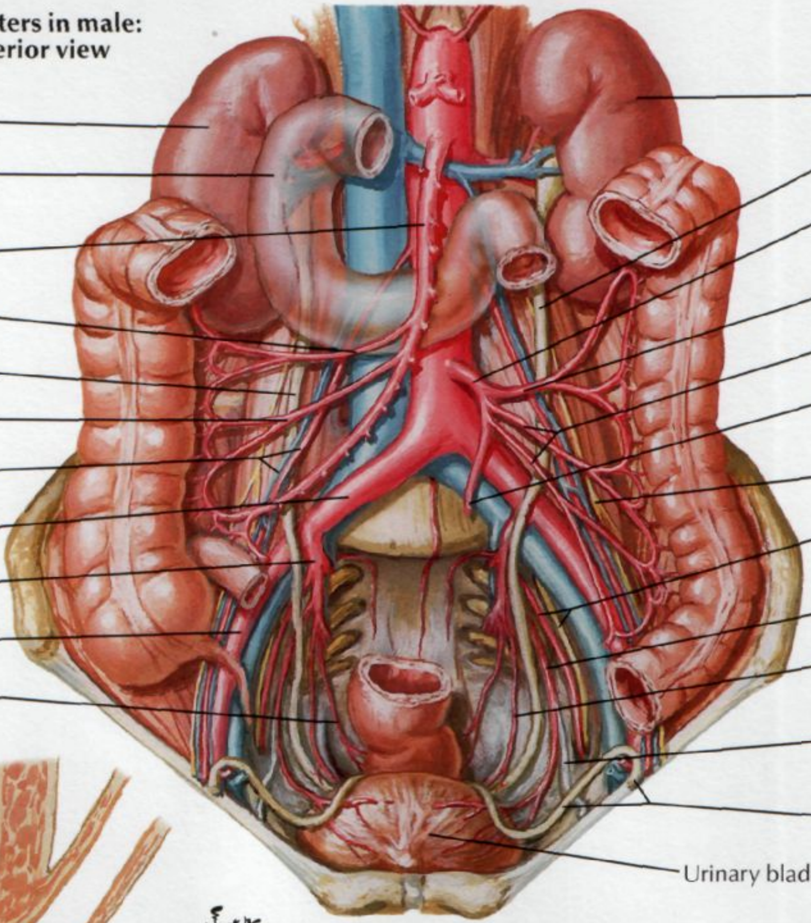
Blood Vessels in Parenchyma of Kidney: Schema

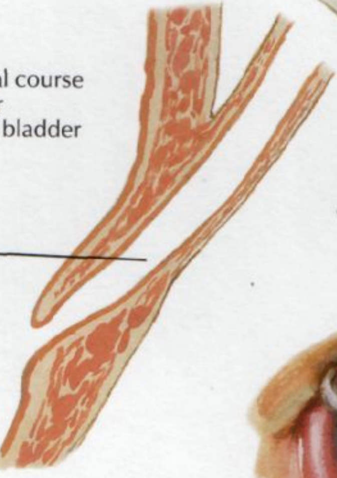

Afferent glomerular arteriole
Efferent glomerular arteriole
Juxtamedullary glomerulus (efferent glomerular arteriole descends into renal pyramid)
Fibrous capsule
Cortical glomerulus
Efferent glomerular arteriole (joins cortical capillary plexus)
Afferent glomerular arteriole
Cortical capillary plexus
Stellate veins
Corticomedullary glomerulus
Efferent glomerular arteriole (joins cortical capillary plexus and also descends into renal pyramid)
Afferent glomerular arteriole
Aglomerular arteriole to capillary plexus
Capsular and perforating veins
Cortical radiate (interlobular) arteries and veins
Subcapsular zone
Afferent glomerular arteriole from arcuate artery
Arcuate artery and vein
Vasa rectae spuria (from juxtamedullary efferent glomerular arterioles)
Vasa rectae vera (from arcuate and cortical radiate arteries)
Venulae rectae
Medullary capillary plexus
Interlobar artery and vein
Renal column (Bertin)
Henle's loop of nephron
Collecting tubule
Interlobar artery and vein in perirenal fat of renal sinus
Renal cortex
Renal medulla (pyramid)

Ureters

SEE ALSO PLATES 349, 350, 354

Ureters in male: anterior view





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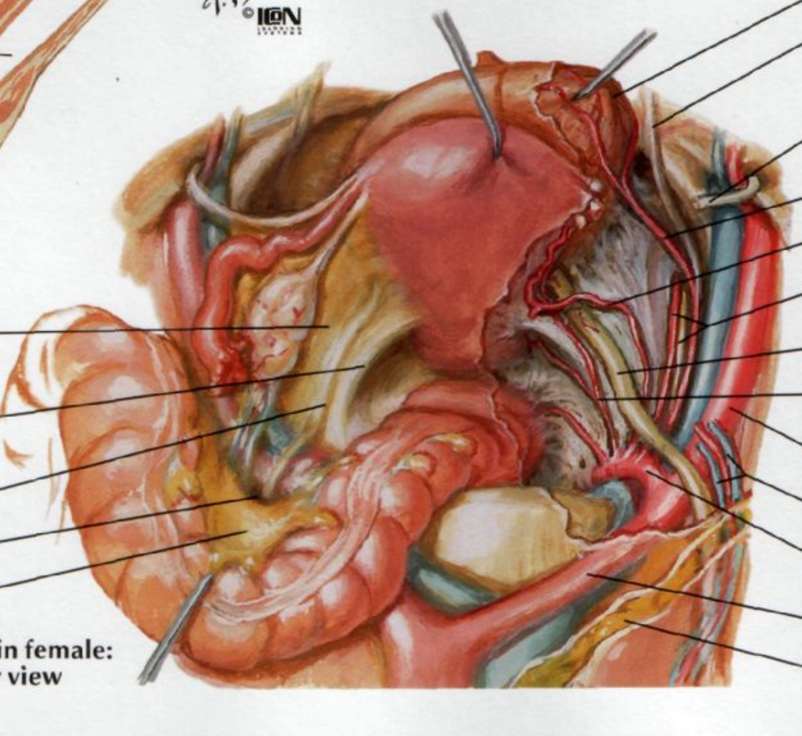
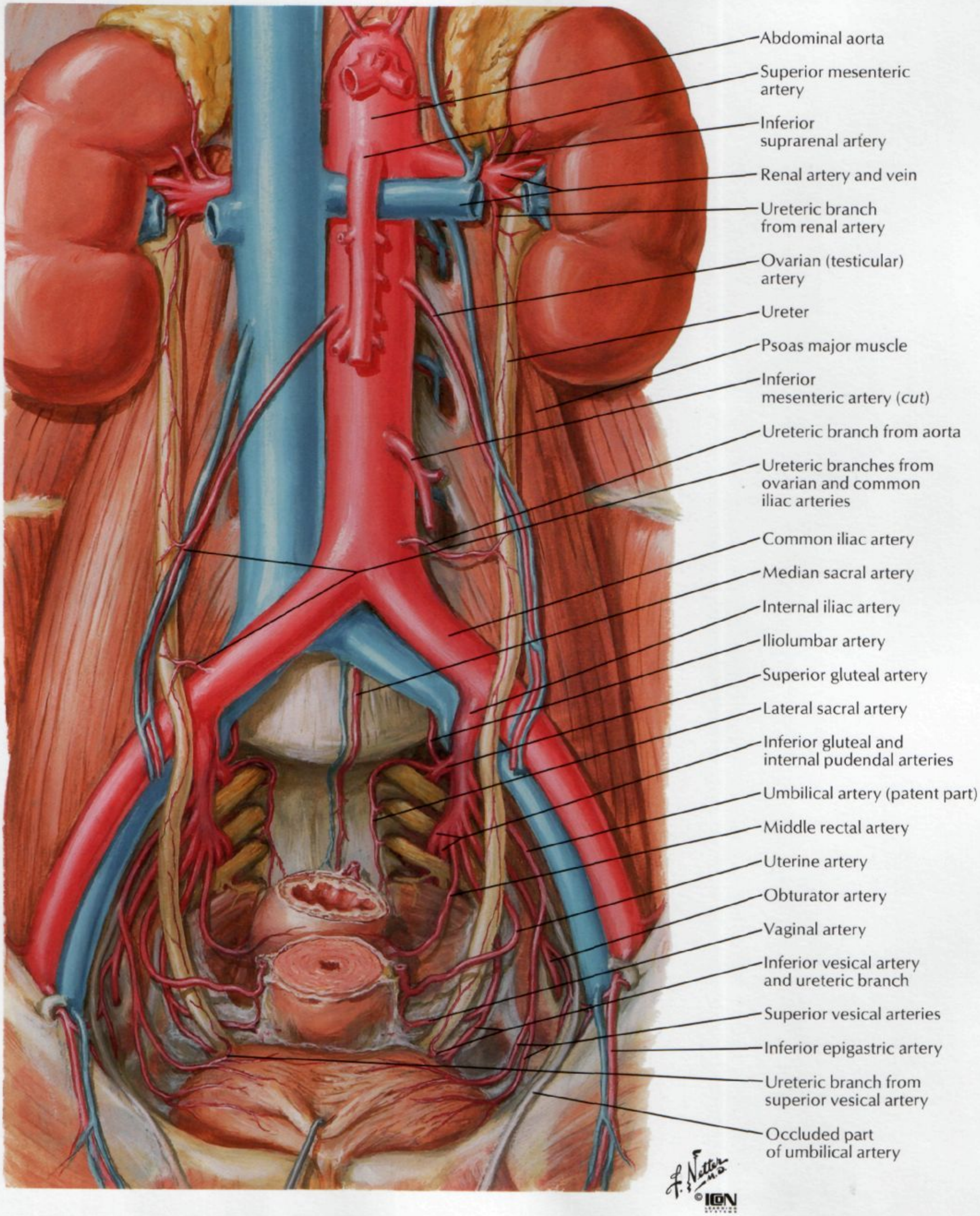


Ureters in female: superior view

Arteries of Ureters and Urinary Bladder



Abdominal aorta
Superior mesenteric artery
Inferior suprarenal artery
Renal artery and vein
Ureteric branch from renal artery
Ovarian (testicular) artery
Ureter
Psoas major muscle
Inferior mesenteric artery (*cut*)
Ureteric branch from aorta
Ureteric branches from ovarian and common iliac arteries
Common iliac artery
Median sacral artery
Internal iliac artery
Iliolumbar artery
Superior gluteal artery
Lateral sacral artery
Inferior gluteal and internal pudendal arteries
Umbilical artery (patent part)
Middle rectal artery
Uterine artery
Obturator artery
Vaginal artery
Inferior vesical artery and ureteric branch
Superior vesical arteries
Inferior epigastric artery
Ureteric branch from superior vesical artery
Occluded part of umbilical artery
F. Netter M.D.
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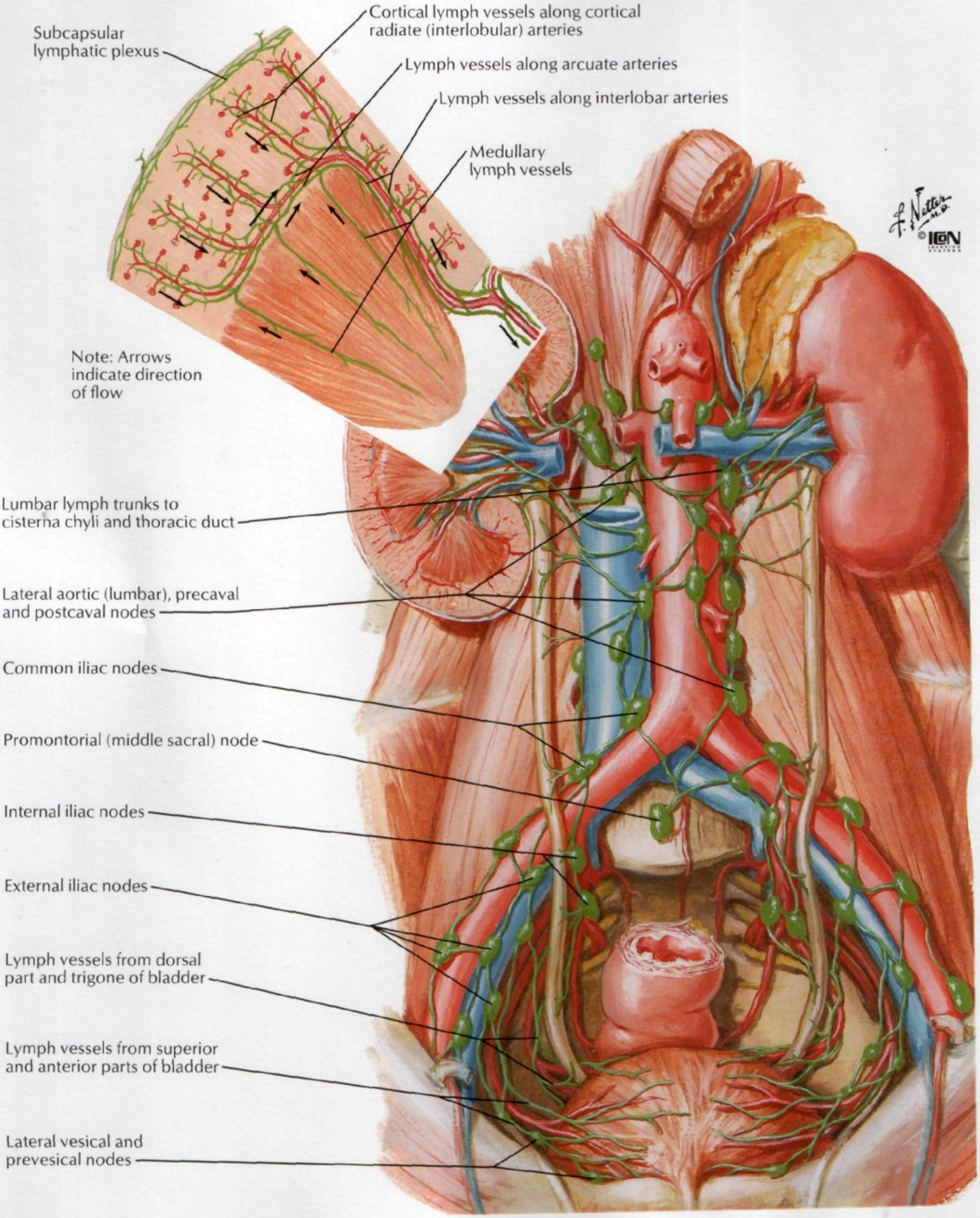
Lymph Vessels and Nodes of Kidneys and Urinary Bladder

SEE ALSO PLATES 386, 388



Subcapsular lymphatic plexus
Cortical lymph vessels along cortical radiate (interlobular) arteries
Lymph vessels along arcuate arteries
Lymph vessels along interlobar arteries
Medullary lymph vessels
Note: Arrows indicate direction of flow
Lumbar lymph trunks to cisterna chyli and thoracic duct
Lateral aortic (lumbar), precaval and postcaval nodes
Common iliac nodes
Promontorial (middle sacral) node
Internal iliac nodes
External iliac nodes
Lymph vessels from dorsal part and trigone of bladder
Lymph vessels from superior and anterior parts of bladder
Lateral vesical and prevesical nodes
F. Netter M.D.
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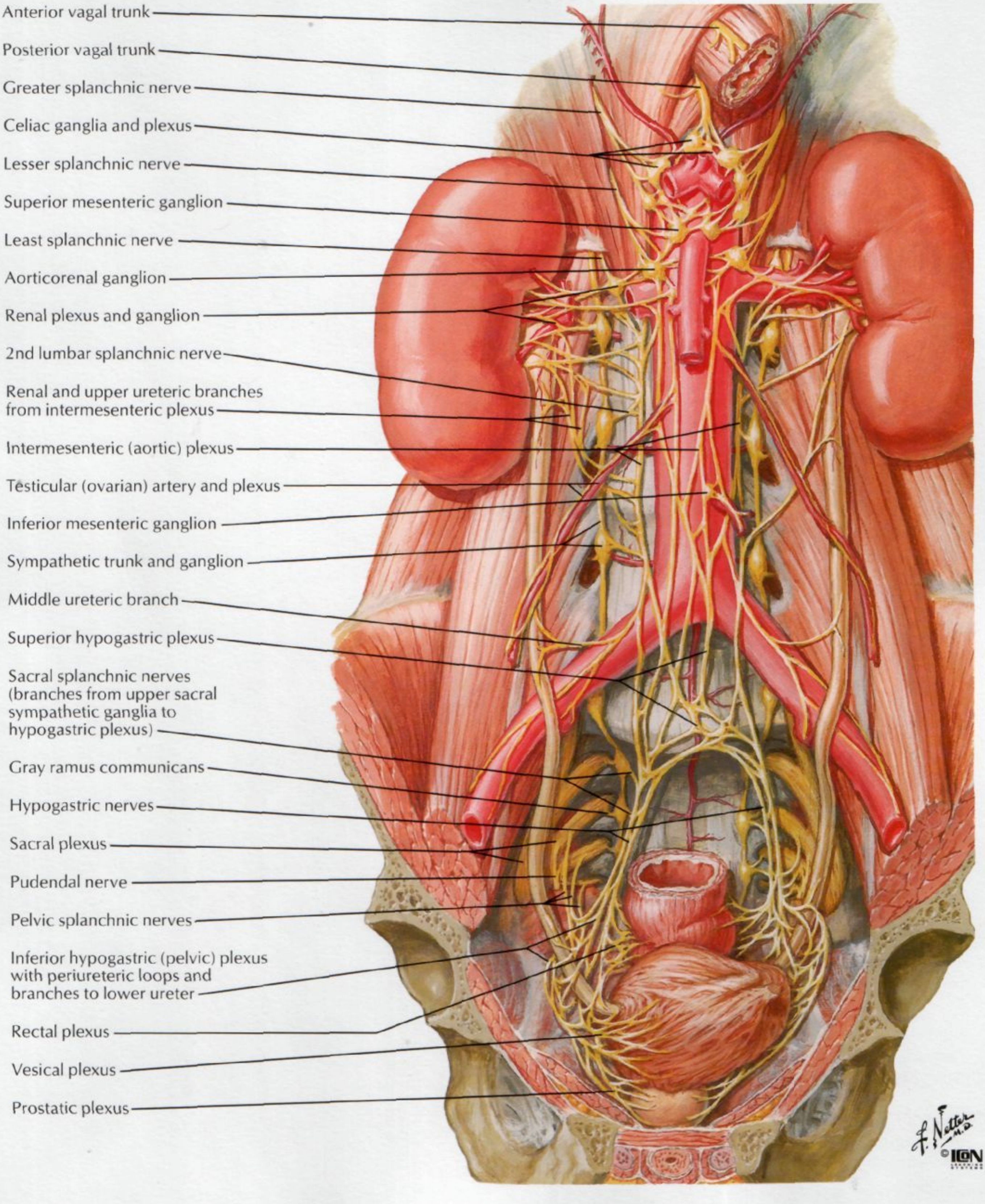
Nerves of Kidneys, Ureters and Urinary Bladder

SEE ALSO PLATE 159


Anterior vagal trunk
Posterior vagal trunk
Greater splanchnic nerve
Celiac ganglia and plexus
Lesser splanchnic nerve
Superior mesenteric ganglion
Least splanchnic nerve
Aorticorenal ganglion
Renal plexus and ganglion
2nd lumbar splanchnic nerve
Renal and upper ureteric branches from intermesenteric plexus
Intermesenteric (aortic) plexus
Testicular (ovarian) artery and plexus
Inferior mesenteric ganglion
Sympathetic trunk and ganglion
Middle ureteric branch
Superior hypogastric plexus
Sacral splanchnic nerves (branches from upper sacral sympathetic ganglia to hypogastric plexus)
Gray ramus communicans
Hypogastric nerves
Sacral plexus
Pudendal nerve
Pelvic splanchnic nerves
Inferior hypogastric (pelvic) plexus with periureteric loops and branches to lower ureter
Rectal plexus
Vesical plexus
Prostatic plexus
F. Netter M.D.
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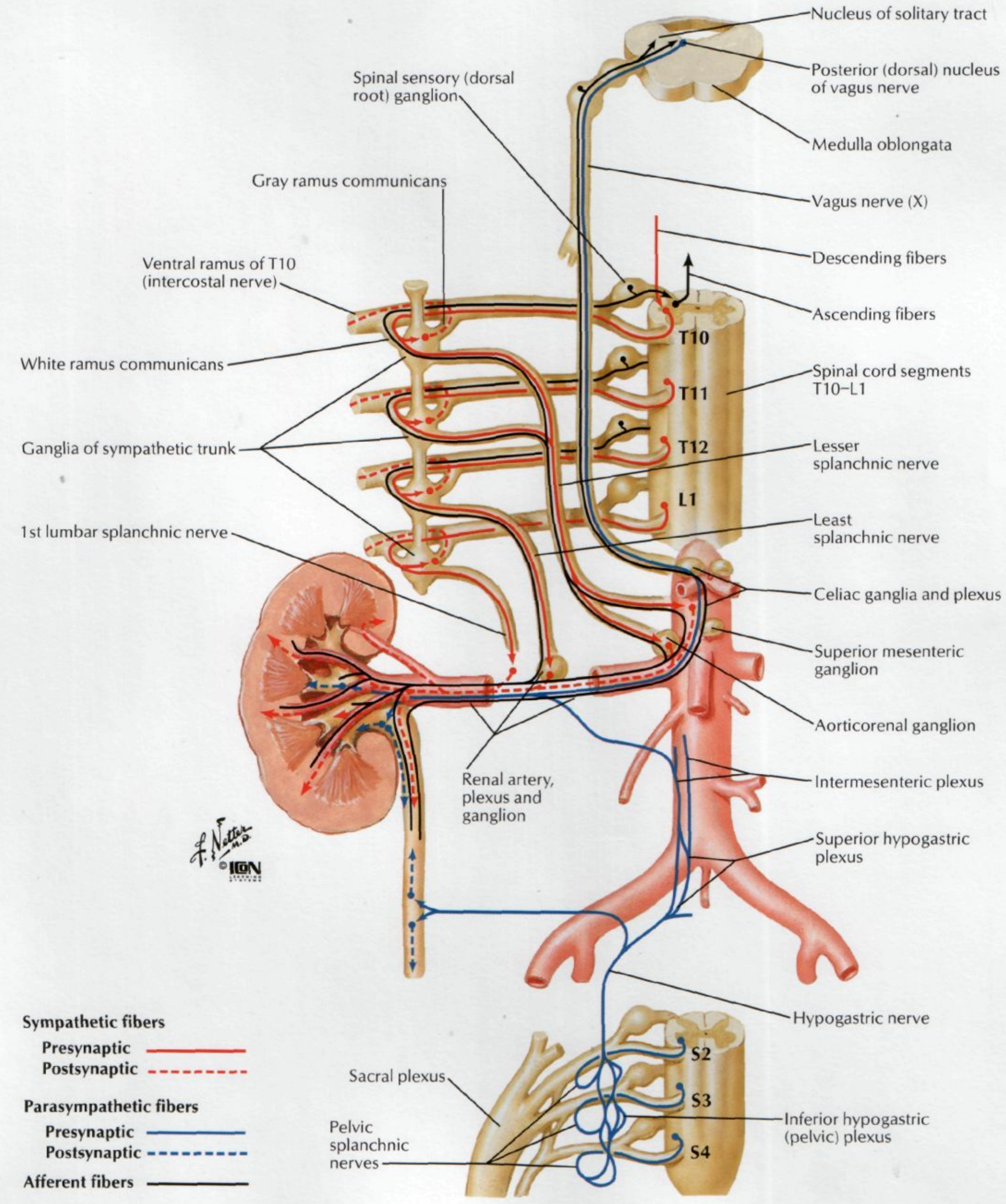
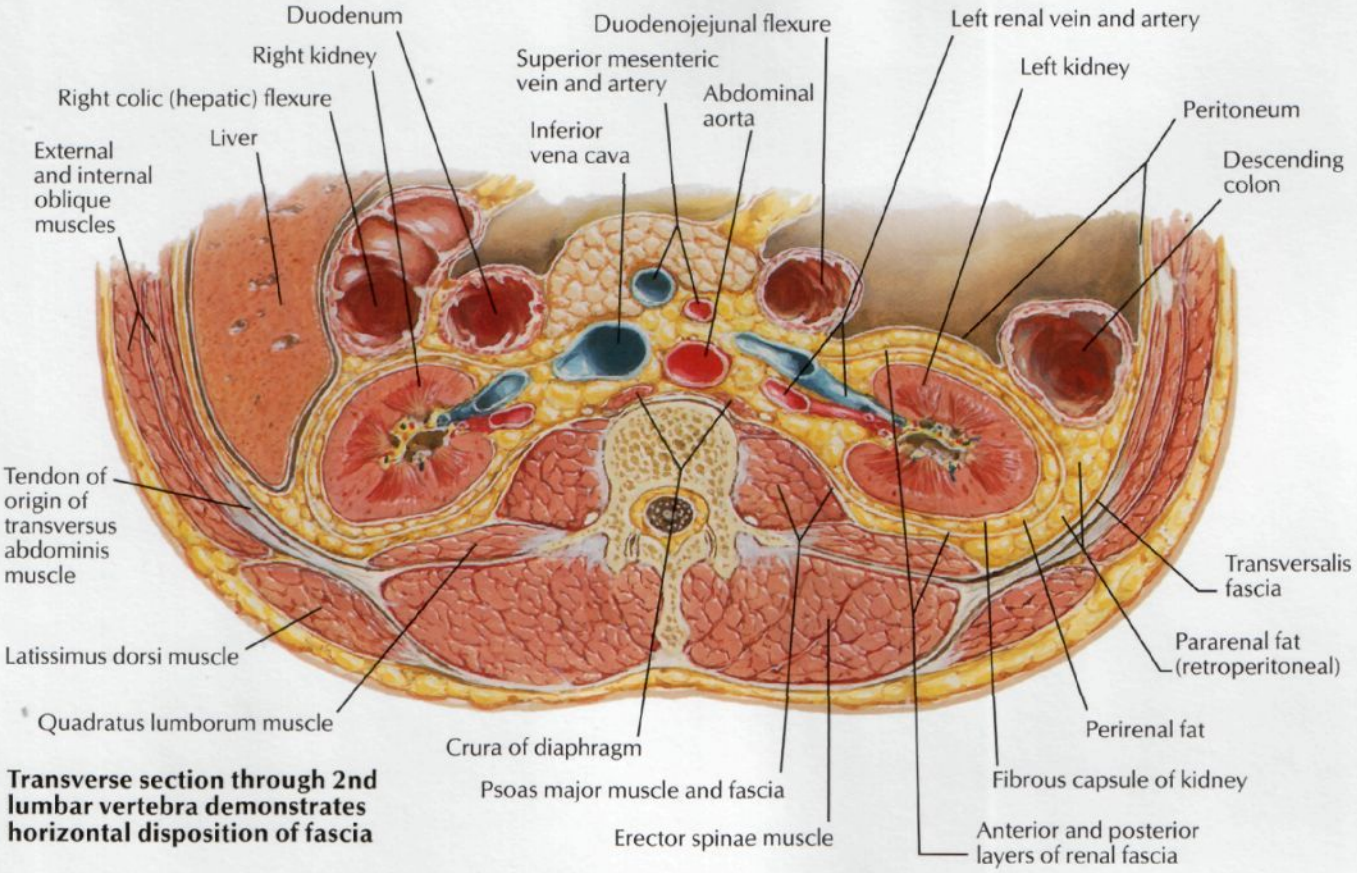
Innervation of Kidneys and Upper Ureters: Schema

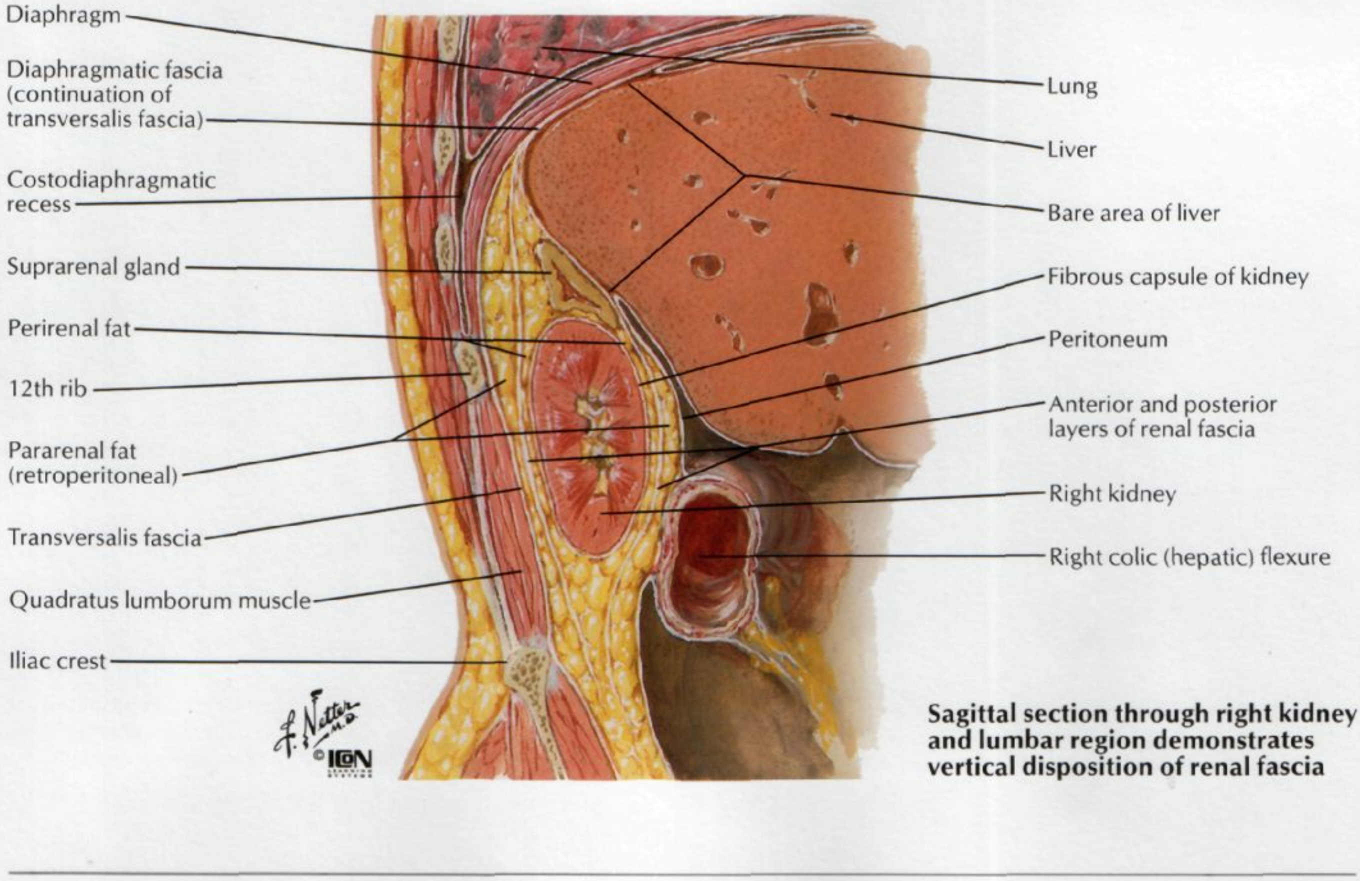
SEE ALSO PLATES 160, 397



Renal Fascia


Duodenum
Right kidney
Right colic (hepatic) flexure
Liver
External and internal oblique muscles
Superior mesenteric vein and artery
Inferior vena cava
Abdominal aorta
Duodenojejunal flexure
Left renal vein and artery
Left kidney
Peritoneum
Descending colon
Tendon of origin of transversus abdominis muscle
Latissimus dorsi muscle
Quadratus lumborum muscle
Crura of diaphragm
Psoas major muscle and fascia
Erector spinae muscle
Transversalis fascia
Pararenal fat (retroperitoneal)
Perirenal fat
Fibrous capsule of kidney
Anterior and posterior layers of renal fascia

Transverse section through 2nd lumbar vertebra demonstrates horizontal disposition of fascia


Diaphragm
Diaphragmatic fascia (continuation of transversalis fascia)
Costodiaphragmatic recess
Suprarenal gland
Perirenal fat
12th rib
Pararenal fat (retroperitoneal)
Transversalis fascia
Quadratus lumborum muscle
Iliac crest
Lung
Liver
Bare area of liver
Fibrous capsule of kidney
Peritoneum
Anterior and posterior layers of renal fascia
Right kidney
Right colic (hepatic) flexure
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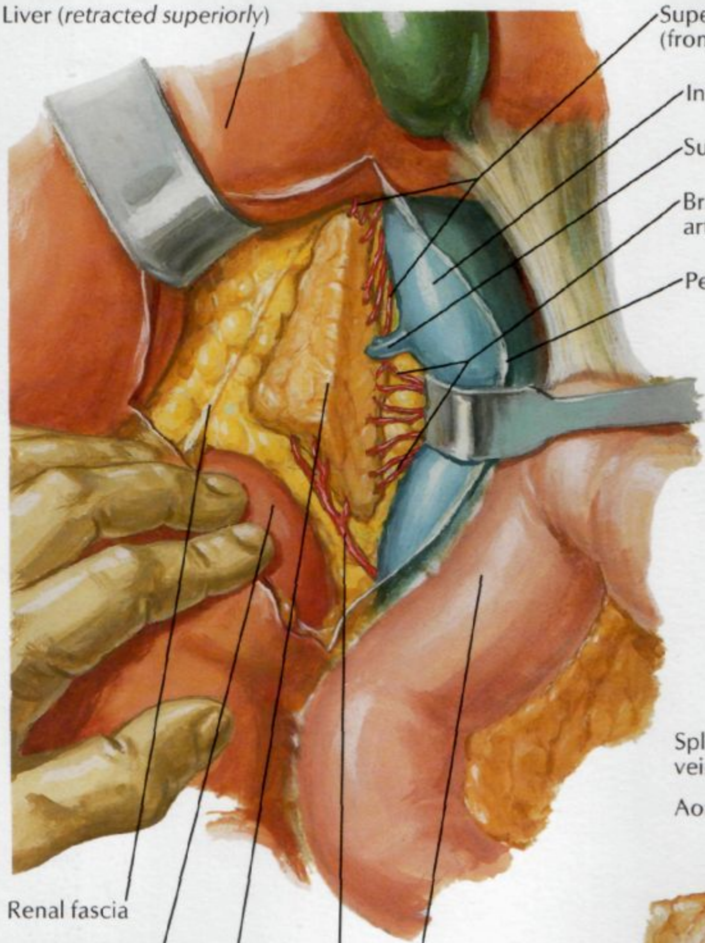
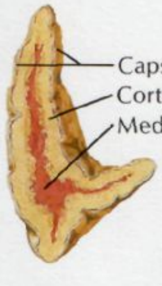
Sagittal section through right kidney and lumbar region demonstrates vertical disposition of renal fascia

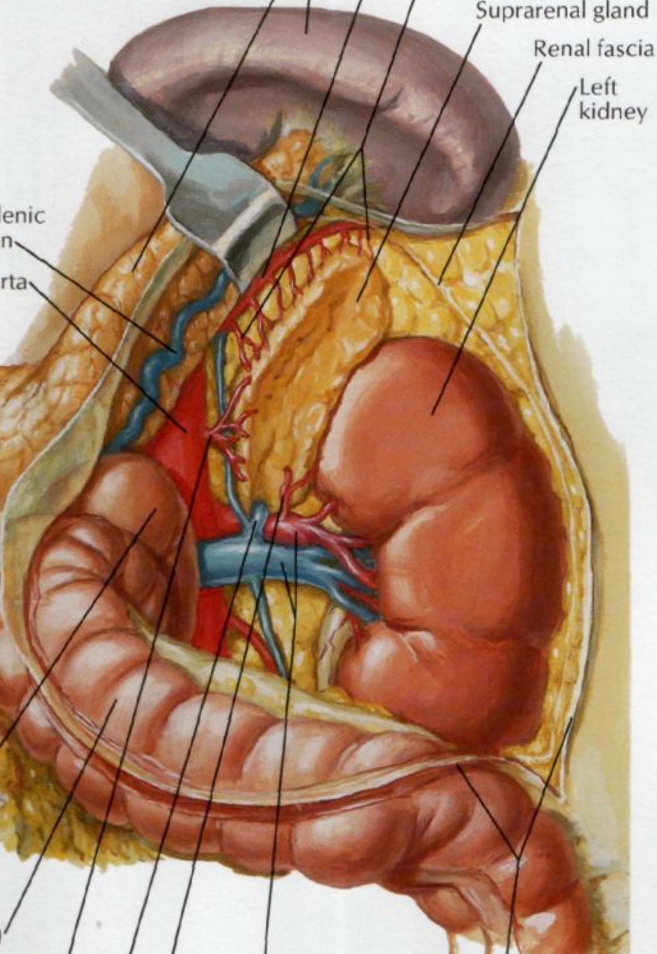
Arteries and Veins of Suprarenal Glands In Situ


Liver (*retracted superiorly*)
Superior suprarenal arteries (from inferior phrenic artery)
Inferior vena cava (*retracted medially*)
Suprarenal vein
Branches of middle suprarenal arteries (from abdominal aorta)
Peritoneum (*cut edge*)
Renal fascia
Right kidney (*pulled down*)
Suprarenal gland
Inferior suprarenal artery (from renal artery)
Duodenum (*pulled down*)

Abdominal exposure of right suprarenal gland



Cross section through suprarenal gland


Pancreas and spleen (*retracted superiorly*)
Left inferior phrenic artery
Superior suprarenal arteries
Suprarenal gland
Renal fascia
Left kidney
Splenic vein
Aorta
Duodeno-jejunal flexure
Left colic (splenic) flexure (*pulled medially*)
Middle suprarenal artery
Suprarenal vein
Inferior suprarenal artery
Left renal artery and vein
Peritoneum (*cut edges*)
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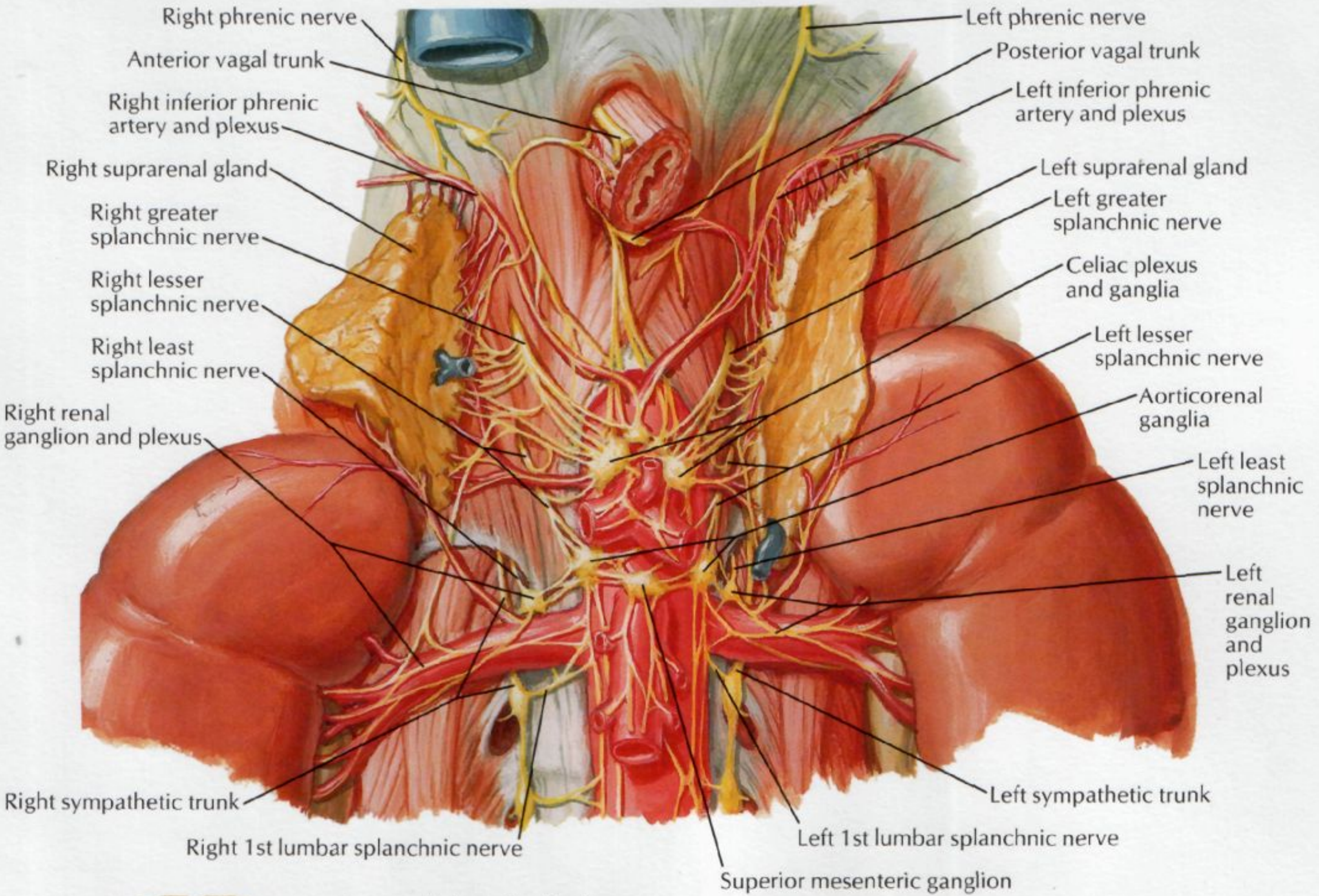
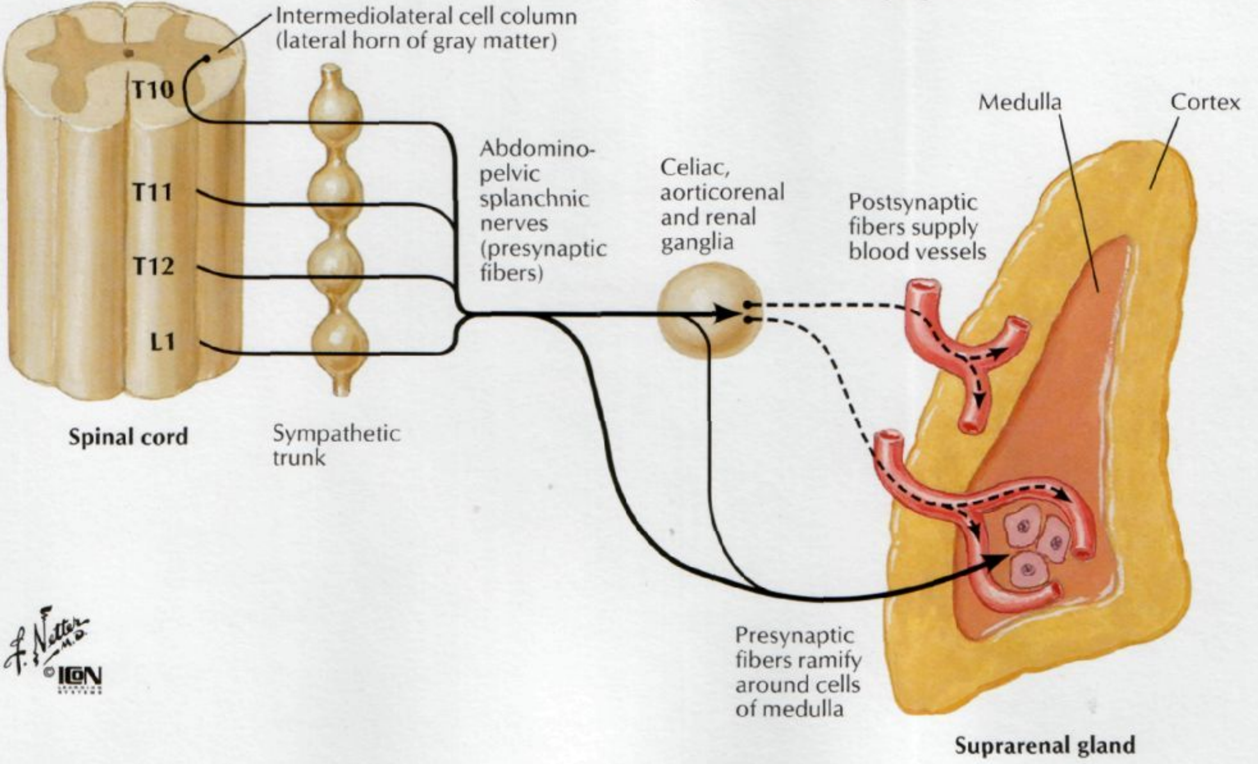
Abdominal exposure of left suprarenal gland

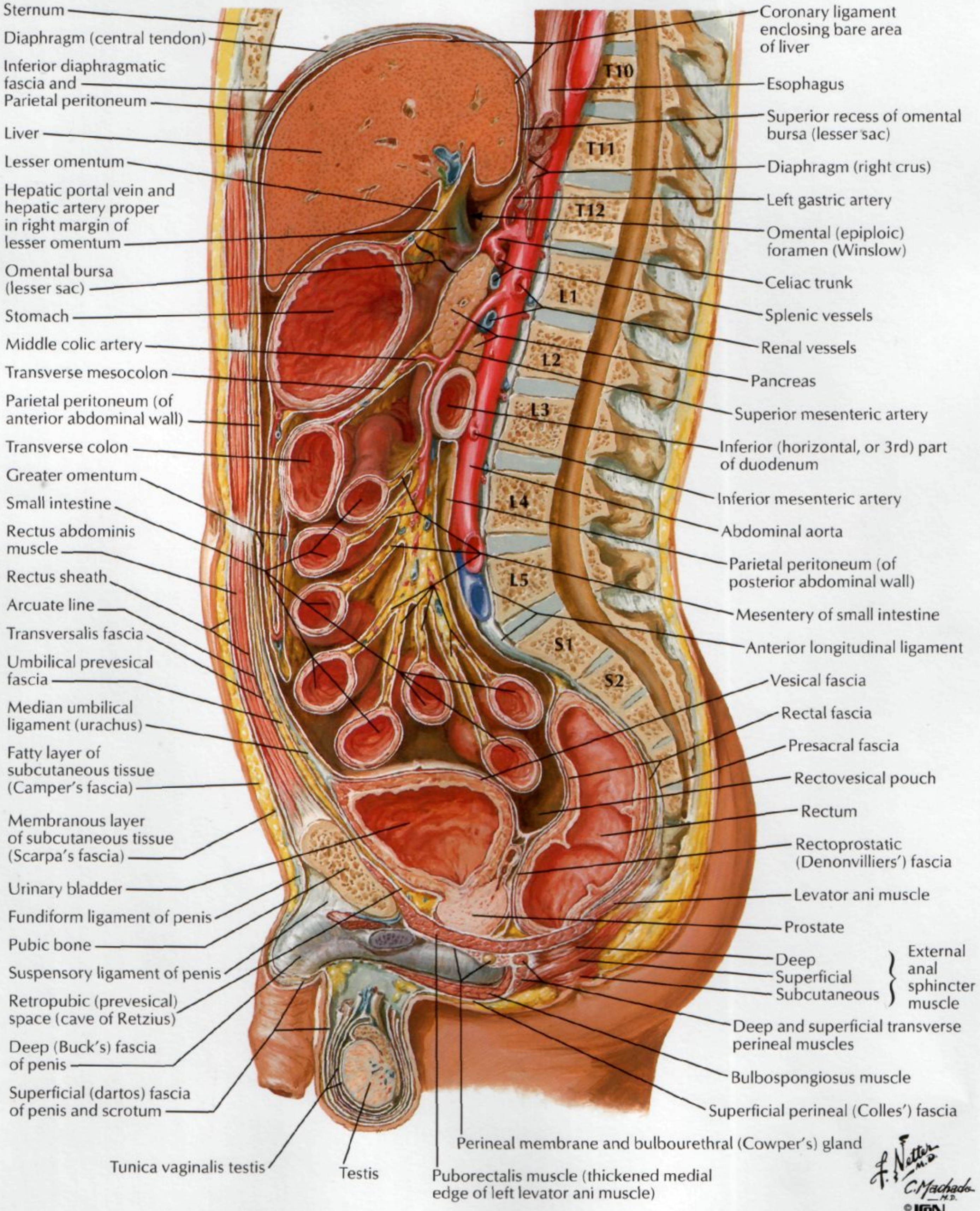
Nerves of Suprarenal Glands: Dissection and Schema

SEE ALSO PLATES 159, 160


Right phrenic nerve
Anterior vagal trunk
Right inferior phrenic artery and plexus
Right suprarenal gland
Right greater splanchnic nerve
Right lesser splanchnic nerve
Right least splanchnic nerve
Right renal ganglion and plexus
Right sympathetic trunk
Right 1st lumbar splanchnic nerve
Left phrenic nerve
Posterior vagal trunk
Left inferior phrenic artery and plexus
Left suprarenal gland
Left greater splanchnic nerve
Celiac plexus and ganglia
Left lesser splanchnic nerve
Aorticorenal ganglia
Left least splanchnic nerve
Left renal ganglion and plexus
Left sympathetic trunk
Left 1st lumbar splanchnic nerve
Superior mesenteric ganglion


Intermediolateral cell column (lateral horn of gray matter)
T10
T11
T12
L1
Spinal cord
Sympathetic trunk
Abdomino-pelvic splanchnic nerves (presynaptic fibers)
Celiac, aorticorenal and renal ganglia
Medulla
Cortex
Postsynaptic fibers supply blood vessels
Presynaptic fibers ramify around cells of medulla
Suprarenal gland

Abdominal Wall and Viscera: Median (Sagittal) Section


Sternum
Diaphragm (central tendon)
Inferior diaphragmatic fascia and
Parietal peritoneum
Liver
Lesser omentum
Hepatic portal vein and hepatic artery proper in right margin of lesser omentum
Omental bursa (lesser sac)
Stomach
Middle colic artery
Transverse mesocolon
Parietal peritoneum (of anterior abdominal wall)
Transverse colon
Greater omentum
Small intestine
Rectus abdominis muscle
Rectus sheath
Arcuate line
Transversalis fascia
Umbilical prevesical fascia
Median umbilical ligament (urachus)
Fatty layer of subcutaneous tissue (Camper's fascia)
Membranous layer of subcutaneous tissue (Scarpa's fascia)
Urinary bladder
Fundiform ligament of penis
Pubic bone
Suspensory ligament of penis
Retropubic (prevesical) space (cave of Retzius)
Deep (Buck's) fascia of penis
Superficial (dartos) fascia of penis and scrotum
Tunica vaginalis testis
Testis
Puborectalis muscle (thickened medial edge of left levator ani muscle)
Perineal membrane and bulbourethral (Cowper's) gland
Coronary ligament enclosing bare area of liver
Esophagus
Superior recess of omental bursa (lesser sac)
Diaphragm (right crus)
Left gastric artery
Omental (epiploic) foramen (Winslow)
Celiac trunk
Splenic vessels
Renal vessels
Pancreas
Superior mesenteric artery
Inferior (horizontal, or 3rd) part of duodenum
Inferior mesenteric artery
Abdominal aorta
Parietal peritoneum (of posterior abdominal wall)
Mesentery of small intestine
Anterior longitudinal ligament
Vesical fascia
Rectal fascia
Presacral fascia
Rectovesical pouch
Rectum
Rectoprostatic (Denonvilliers') fascia
Levator ani muscle
Prostate
Deep
Superficial
Subcutaneous
External anal sphincter muscle
Deep and superficial transverse perineal muscles
Bulbospongiosus muscle
Superficial perineal (Colles') fascia
T10
T11
T12
L1
L2
L3
L4
L5
S1
S2
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C. Machado M.D.
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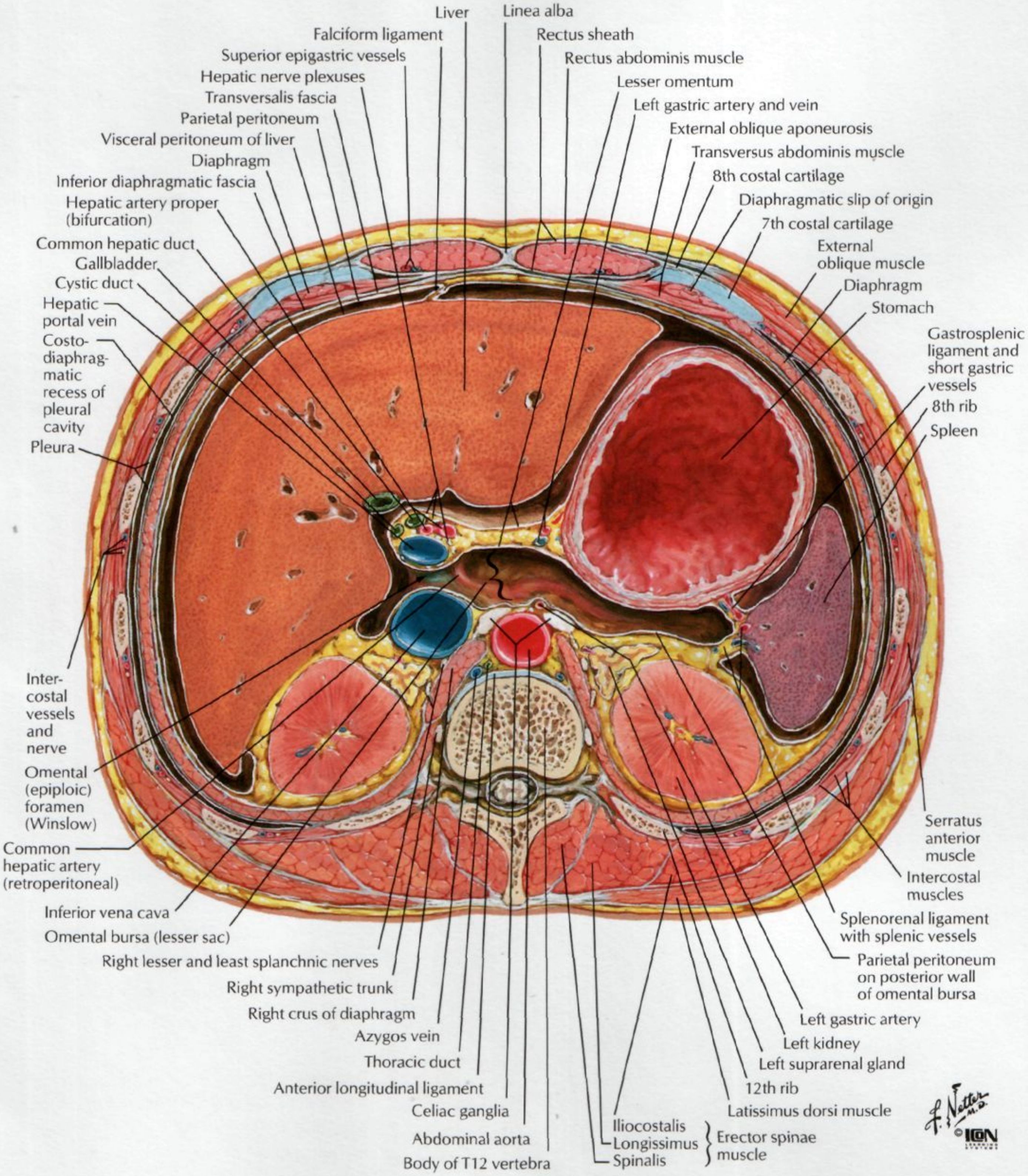
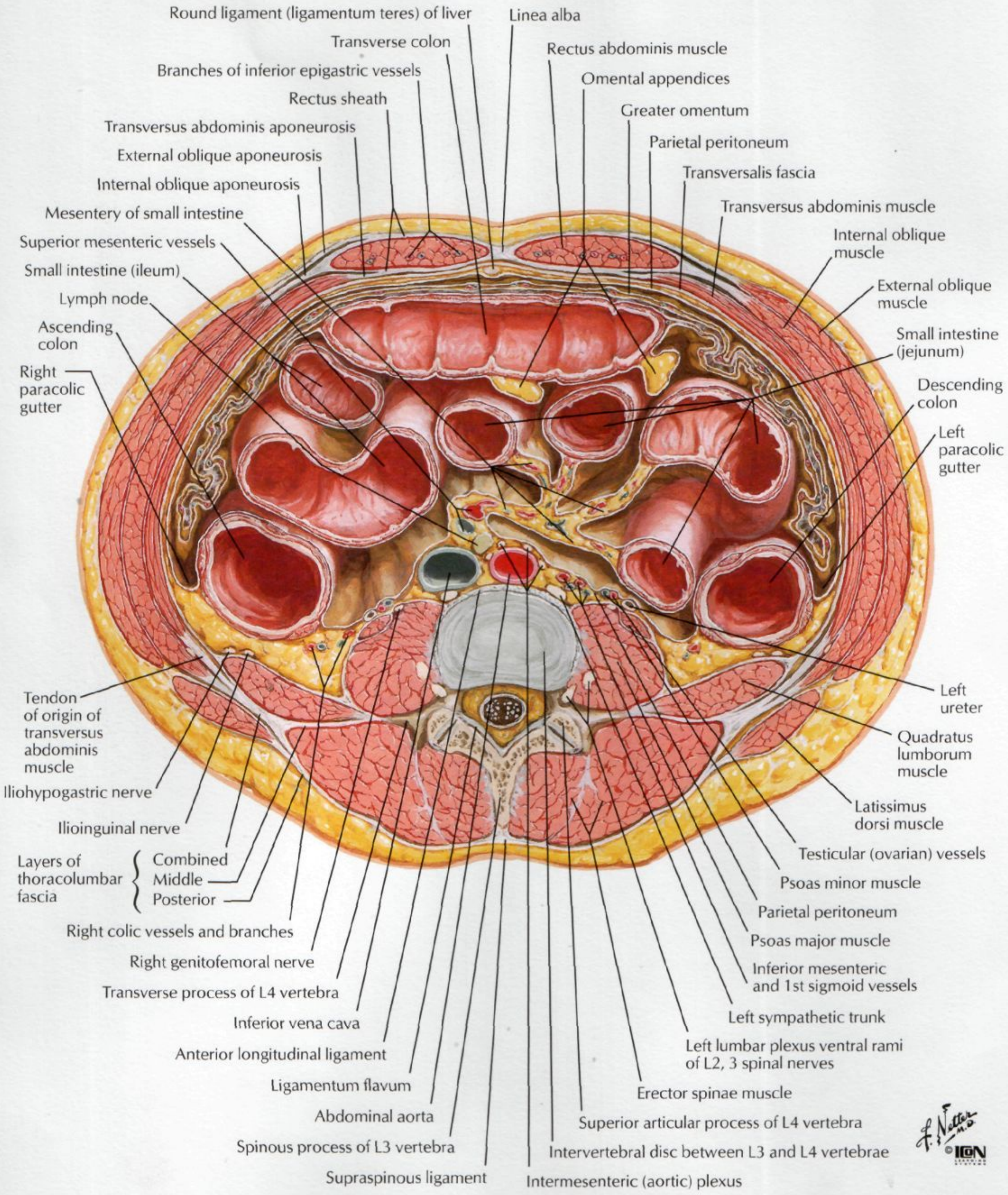
Schematic Cross Section of Abdomen at T12

SEE ALSO PLATES 534–537



Schematic Cross Section of Abdomen at L3, 4


Round ligament (ligamentum teres) of liver
Linea alba
Transverse colon
Rectus abdominis muscle
Branches of inferior epigastric vessels
Omental appendices
Rectus sheath
Greater omentum
Transversus abdominis aponeurosis
Parietal peritoneum
External oblique aponeurosis
Transversalis fascia
Internal oblique aponeurosis
Transversus abdominis muscle
Mesentery of small intestine
Internal oblique muscle
Superior mesenteric vessels
Small intestine (ileum)
External oblique muscle
Lymph node
Small intestine (jejunum)
Ascending colon
Descending colon
Right paracolic gutter
Left paracolic gutter
Tendon of origin of transversus abdominis muscle
Left ureter
Quadratus lumborum muscle
Iliohypogastric nerve
Latissimus dorsi muscle
Ilioinguinal nerve
Testicular (ovarian) vessels
Layers of thoracolumbar fascia
Combined
Middle
Posterior
Psoas minor muscle
Parietal peritoneum
Right colic vessels and branches
Psoas major muscle
Right genitofemoral nerve
Inferior mesenteric and 1st sigmoid vessels
Transverse process of L4 vertebra
Left sympathetic trunk
Inferior vena cava
Left lumbar plexus ventral rami of L2, 3 spinal nerves
Anterior longitudinal ligament
Ligamentum flavum
Erector spinae muscle
Abdominal aorta
Superior articular process of L4 vertebra
Spinous process of L3 vertebra
Intervertebral disc between L3 and L4 vertebrae
Supraspinous ligament
Intermesenteric (aortic) plexus
F. Netter M.D.
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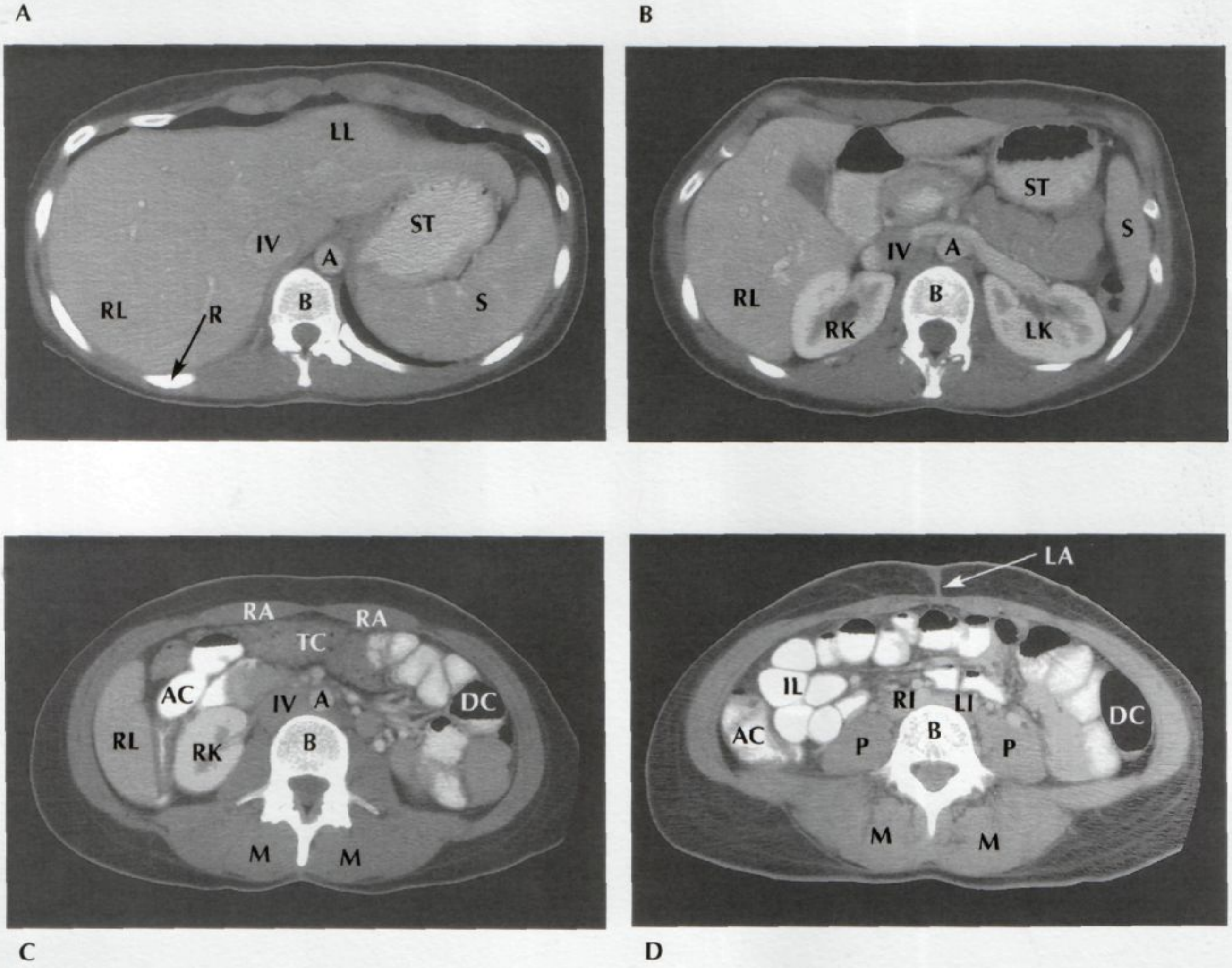
Abdominal Scans: Axial CT Images

Series of abdominal axial CT images from superior (A) to inferior (D)



A	Aorta	**M**	Deep back muscles
AC	Ascending colon	**P**	Psoas muscle
B	Body of vertebra	**R**	Rib
DC	Descending colon	**RA**	Rectus abdominis muscle
IL	Ileum	**RI**	Right common iliac artery
IV	Inferior vena cava	**RL**	Right lobe of liver
LA	Linea alba	**S**	Spleen
LI	Left common iliac artery	**ST**	Stomach
LK	Left kidney	**TC**	Transverse colon
LL	Left lobe of liver		

Section V
PELVIS AND PERINEUM

SURFACE ANATOMY
Plate 339

339. Pelvis and Perineum

BONES AND LIGAMENTS
Plates 340–342

340. Bones and Ligaments of Pelvis
341. Bones and Ligaments of Pelvis (*continued*)
342. Sex Differences of Pelvis: Measurements

PELVIC FLOOR AND CONTENTS
Plates 343–353

343. Pelvic Diaphragm: Female
344. Pelvic Diaphragm: Female (*continued*)
345. Pelvic Diaphragm: Male
346. Pelvic Diaphragm: Male (*continued*)
347. Pelvic Viscera and Perineum: Female
348. Pelvic Viscera and Perineum: Male
349. Pelvic Contents: Female
350. Pelvic Contents: Male
351. Endopelvic Fascia and Potential Spaces
352. Urinary Bladder: Orientation and Supports
353. Urinary Bladder: Female and Male

FEMALE STRUCTURES
Plates 354–362

354. Pelvic Viscera: Female
355. Uterus, Vagina and Supporting Structures
356. Uterus and Adnexa
357. Uterus: Age Changes and Muscle Pattern
358. Uterus: Variations in Position
359. Perineum and External Genitalia (Pudendum or Vulva)
360. Perineum (Superficial Dissection)

361. Perineum and Deep Perineum
362. Female Urethra

MALE STRUCTURES
Plates 363–371

363. Perineum and External Genitalia (Superficial Dissection)
364. Perineum and External Genitalia (Deeper Dissection)
365. Penis
366. Perineal Spaces
367. Prostate and Seminal Vesicles
368. Urethra
369. Descent of Testis
370. Scrotum and Contents
371. Testis, Epididymis and Ductus Deferens

RECTUM
Plates 372–377

372. Rectum In Situ: Female and Male
373. Ischioanal Fossae
374. Rectum and Anal Canal
375. Anorectal Musculature
376. External Anal Sphincter Muscle: Perineal Views
377. Actual and Potential Perineopelvic Spaces

VASCULATURE
Plates 378–388

378. Arteries of Rectum and Anal Canal
379. Veins of Rectum and Anal Canal
380. Arteries and Veins of Pelvic Organs: Female
381. Arteries and Veins of Testis
382. Arteries and Veins of Pelvis: Female
383. Arteries and Veins of Pelvis: Male
384. Arteries and Veins of Perineum and Uterus
385. Arteries and Veins of Perineum: Male
386. Lymph Vessels and Nodes of Pelvis and Genitalia: Female
387. Lymph Vessels and Nodes of Perineum: Female
388. Lymph Vessels and Nodes of Pelvis and Genitalia: Male

INNERVATION
Plates 389–397

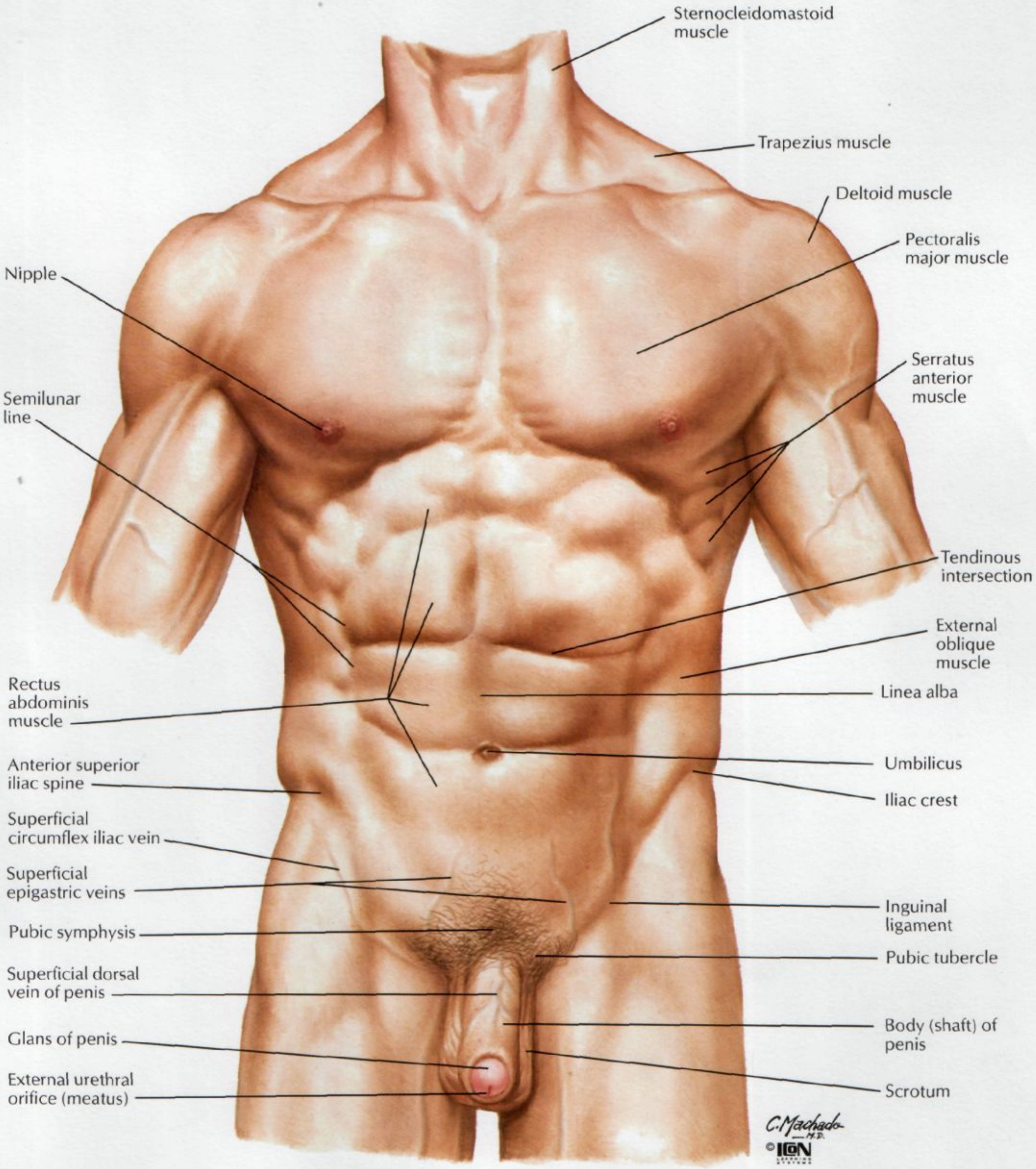
389. Nerves of External Genitalia: Male
390. Nerves of Pelvic Viscera: Male
391. Nerves of Perineum: Male
392. Nerves of Pelvic Viscera: Female
393. Nerves of Perineum and External Genitalia: Female
394. Neuropathways in Parturition
395. Innervation of Female Reproductive Organs: Schema
396. Innervation of Male Reproductive Organs: Schema
397. Innervation of Urinary Bladder and Lower Ureter: Schema

HOMOLOGUES OF GENITALIA
Plates 398–399

398. Homologues of External Genitalia
399. Homologues of Internal Genitalia

REGIONAL SCANS
Plate 400

400. Pelvic Scans: Sagittal MR Images


Sternocleidomastoid muscle
Trapezius muscle
Deltoid muscle
Pectoralis major muscle
Nipple
Serratus anterior muscle
Semilunar line
Tendinous intersection
External oblique muscle
Rectus abdominis muscle
Linea alba
Umbilicus
Anterior superior iliac spine
Iliac crest
Superficial circumflex iliac vein
Superficial epigastric veins
Inguinal ligament
Pubic symphysis
Pubic tubercle
Superficial dorsal vein of penis
Body (shaft) of penis
Glans of penis
Scrotum
External urethral orifice (meatus)
C. Machado M.D.
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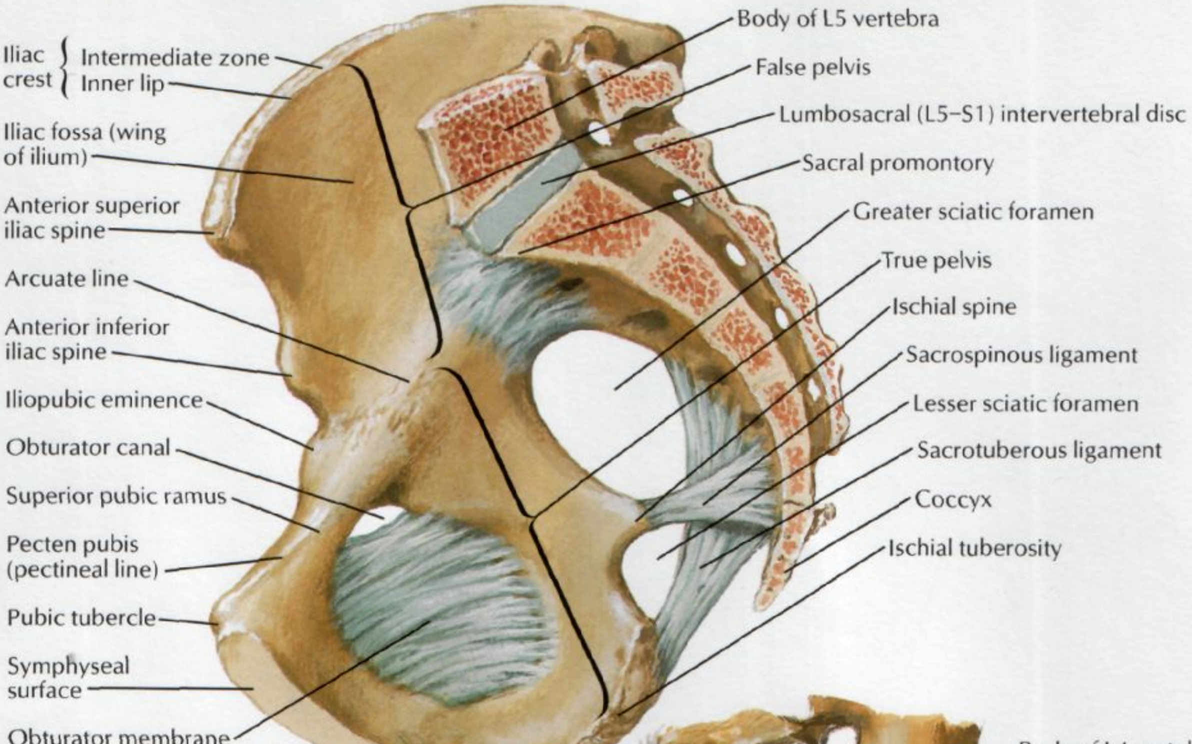
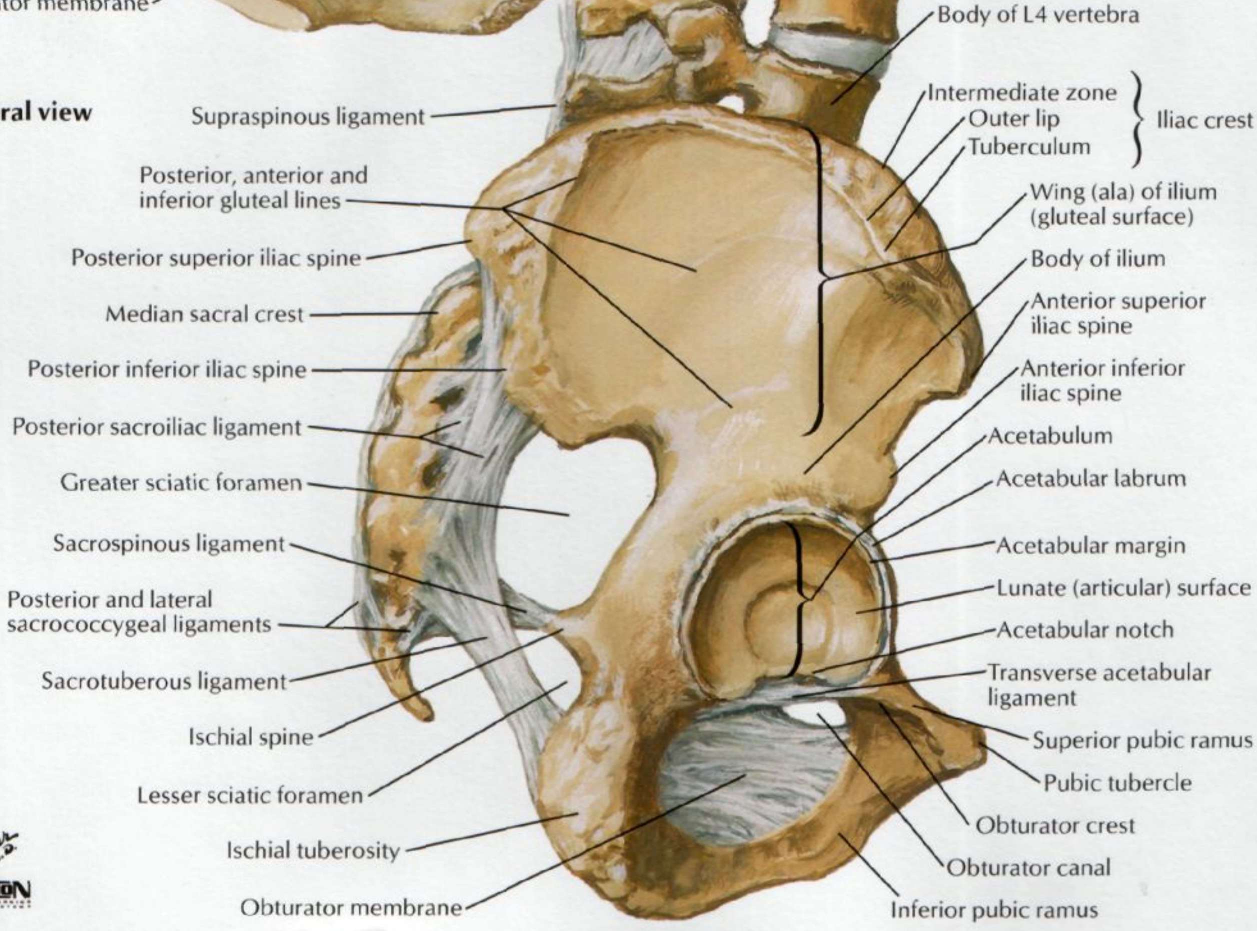
Bones and Ligaments of Pelvis

SEE ALSO PLATE 468

Median (sagittal) section

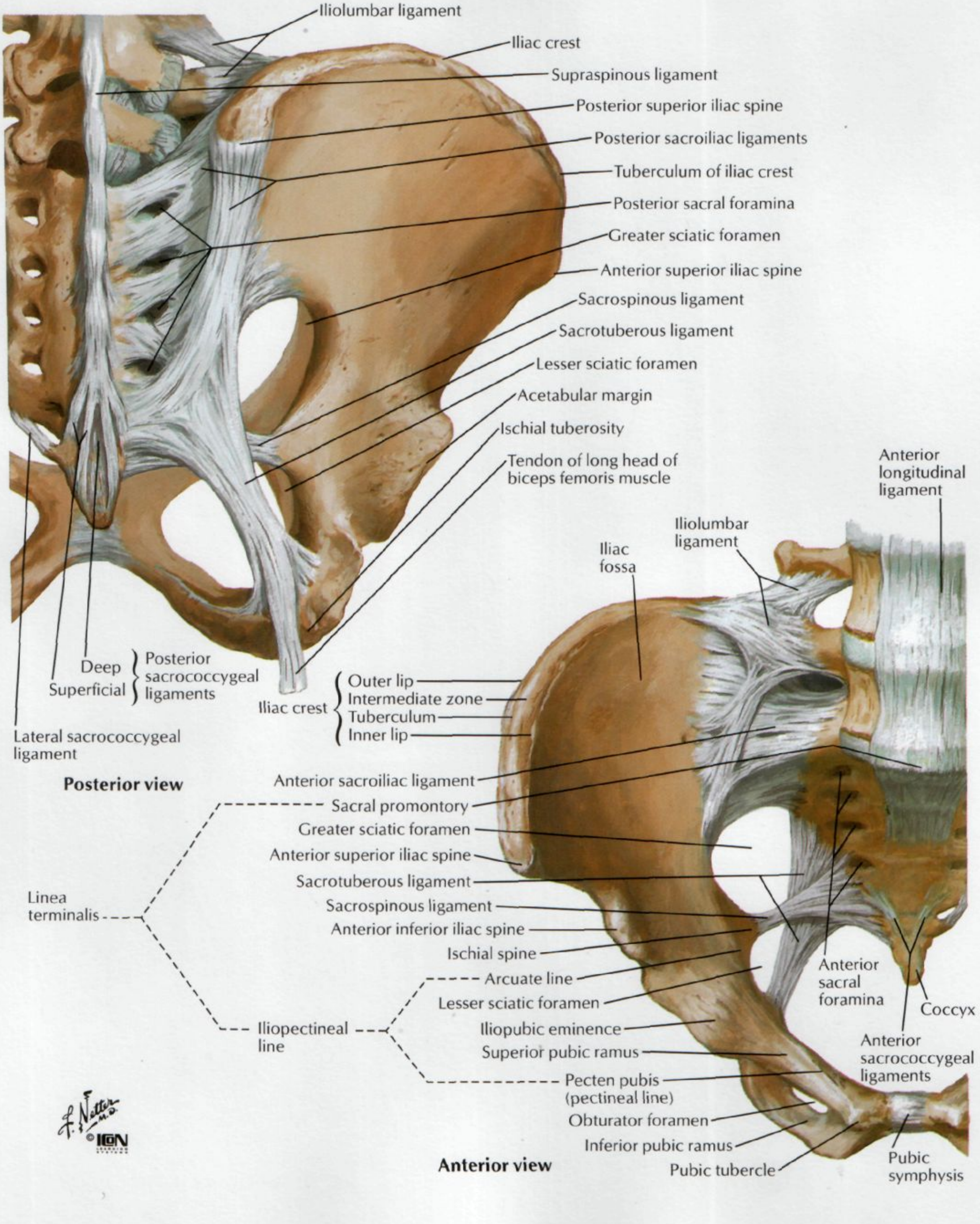


Lateral view



Bones and Ligaments of Pelvis (continued)

SEE ALSO PLATE 150

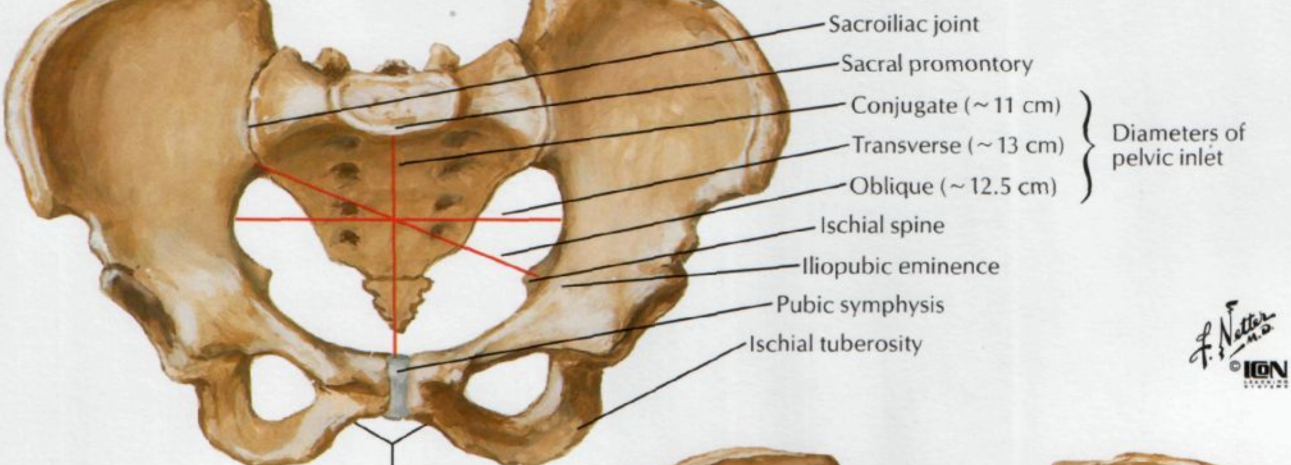


Posterior view

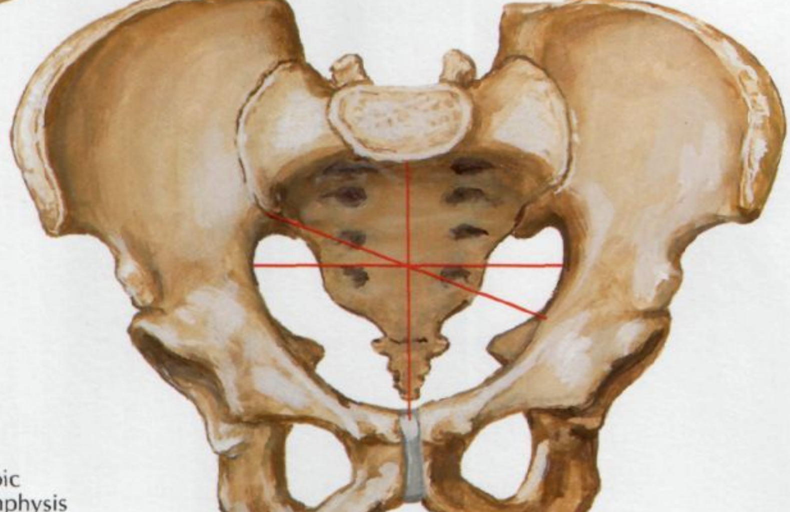
Anterior view

Sex Differences of Pelvis: Measurements

SEE ALSO PLATE 240

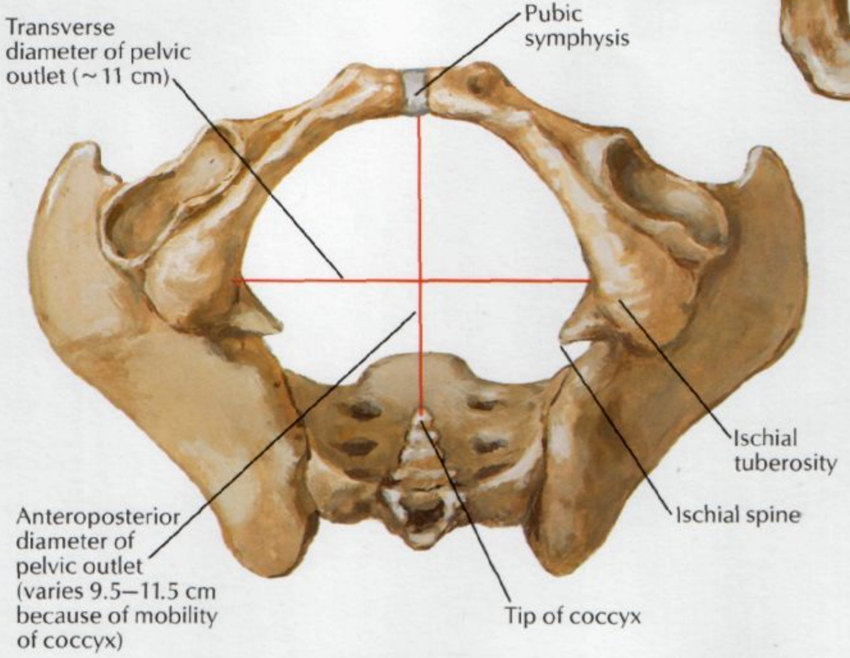


Female pelvis/female pelvic inlet: anterior view



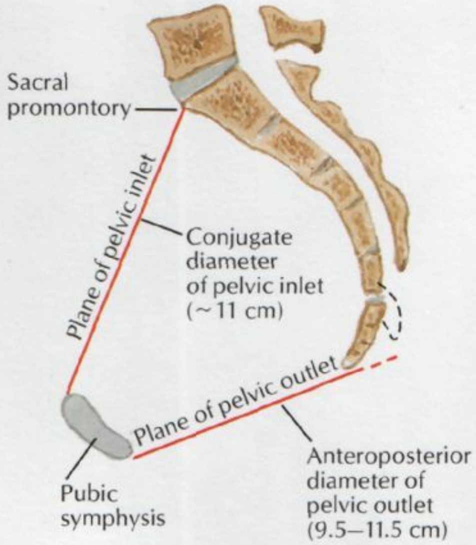
Male pelvis/male pelvic inlet: anterior view

All measurements slightly shorter in relation to body size than in female
Pelvic inlet oriented more anteroposteriorly than in female, where it tends to be transversely oval
Pubic symphysis deeper (taller)
Pubic arch (subpubic angle) narrower
Ischial tuberosities less far apart
Iliac wings less flared



Transverse diameter of pelvic outlet (~ 11 cm)
Pubic symphysis
Ischial tuberosity
Ischial spine
Anteroposterior diameter of pelvic outlet (varies 9.5—11.5 cm because of mobility of coccyx)
Tip of coccyx

Female pelvis/female pelvic outlet: inferior view

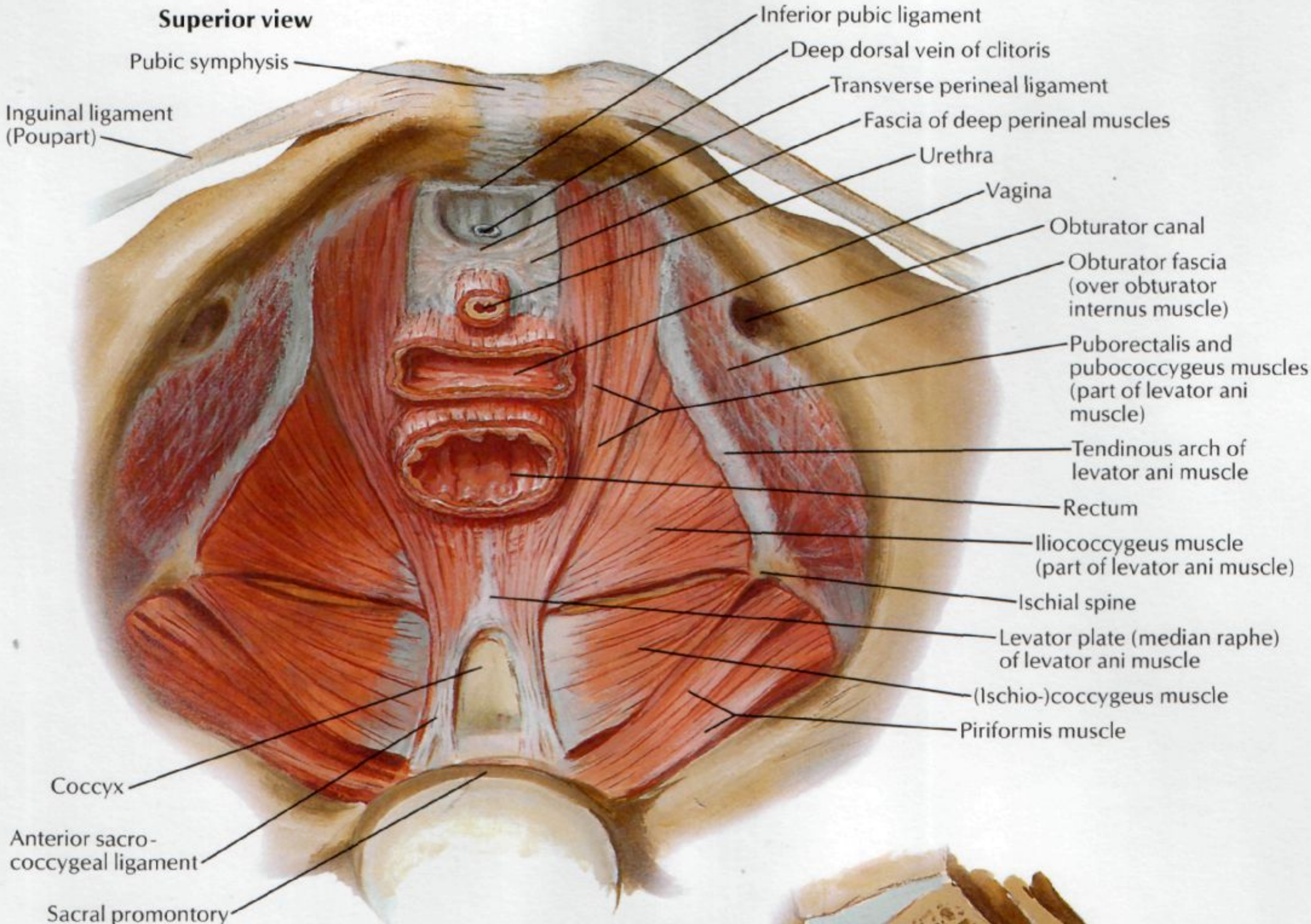


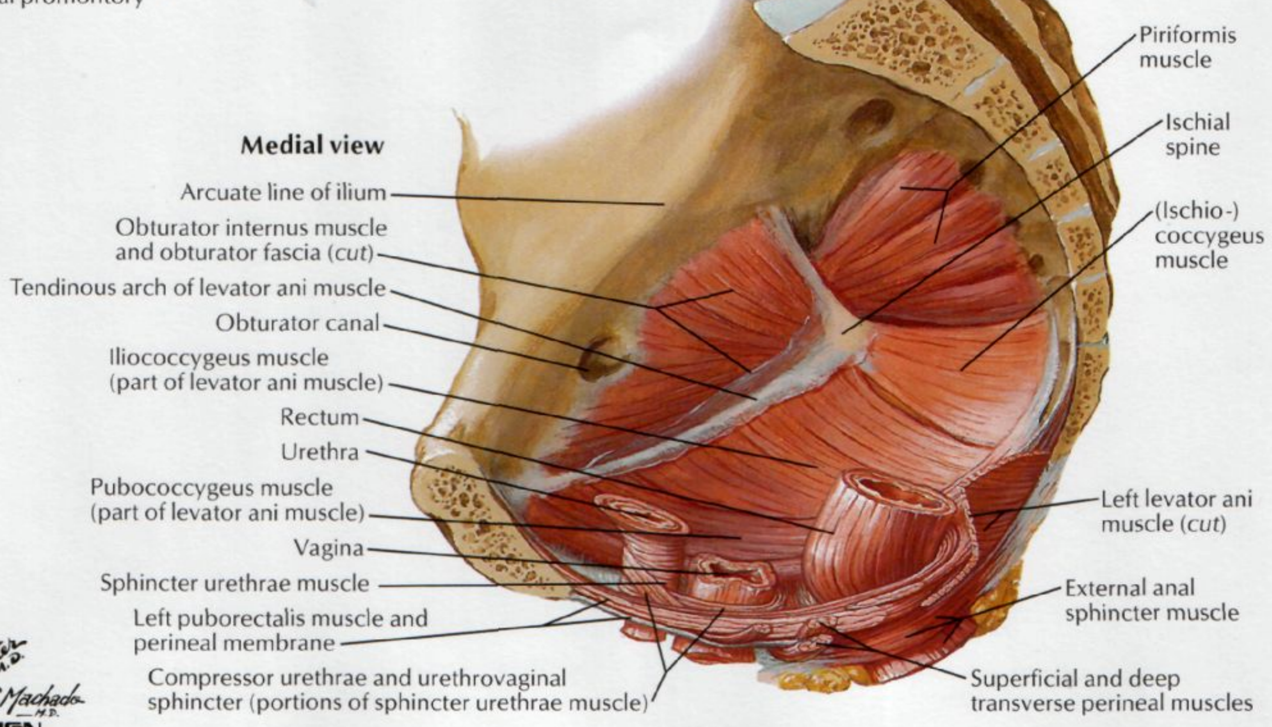
Sacral promontory
Plane of pelvic inlet
Conjugate diameter of pelvic inlet (~ 11 cm)
Plane of pelvic outlet
Pubic symphysis
Anteroposterior diameter of pelvic outlet (9.5—11.5 cm)

Female: sagittal section

Pelvic Diaphragm: Female

SEE ALSO PLATES 255, 353, 355, 373

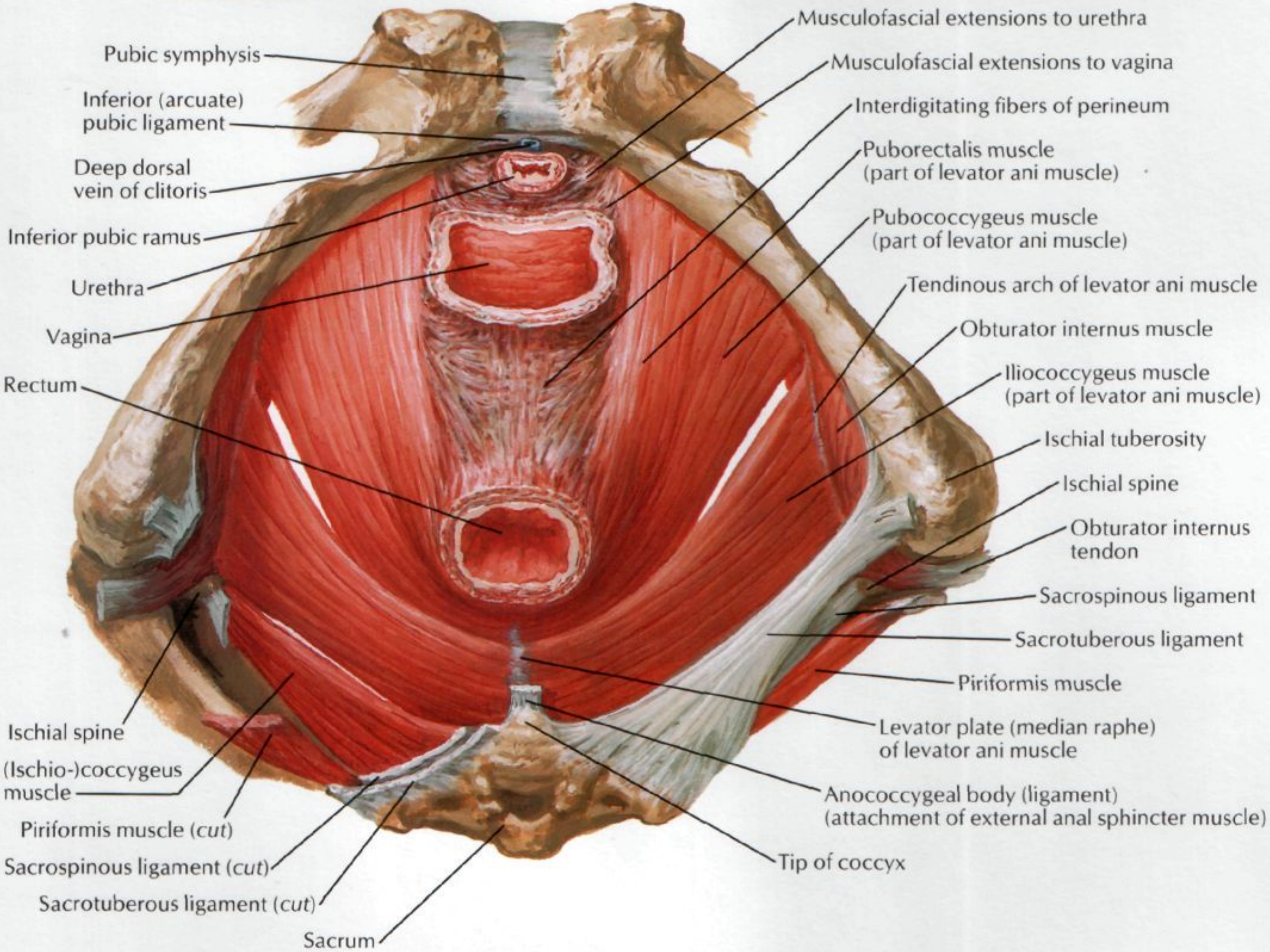

Superior view
Inferior pubic ligament
Pubic symphysis
Deep dorsal vein of clitoris
Transverse perineal ligament
Inguinal ligament (Poupart)
Fascia of deep perineal muscles
Urethra
Vagina
Obturator canal
Obturator fascia (over obturator internus muscle)
Puborectalis and pubococcygeus muscles (part of levator ani muscle)
Tendinous arch of levator ani muscle
Rectum
Iliococcygeus muscle (part of levator ani muscle)
Ischial spine
Levator plate (median raphe) of levator ani muscle
(Ischio-)coccygeus muscle
Piriformis muscle
Coccyx
Anterior sacro-coccygeal ligament
Sacral promontory


Piriformis muscle
Medial view
Ischial spine
Arcuate line of ilium
(Ischio-) coccygeus muscle
Obturator internus muscle and obturator fascia (*cut*)
Tendinous arch of levator ani muscle
Obturator canal
Iliococcygeus muscle (part of levator ani muscle)
Rectum
Urethra
Pubococcygeus muscle (part of levator ani muscle)
Left levator ani muscle (*cut*)
Vagina
Sphincter urethrae muscle
External anal sphincter muscle
Left puborectalis muscle and perineal membrane
Compressor urethrae and urethrovaginal sphincter (portions of sphincter urethrae muscle)
Superficial and deep transverse perineal muscles

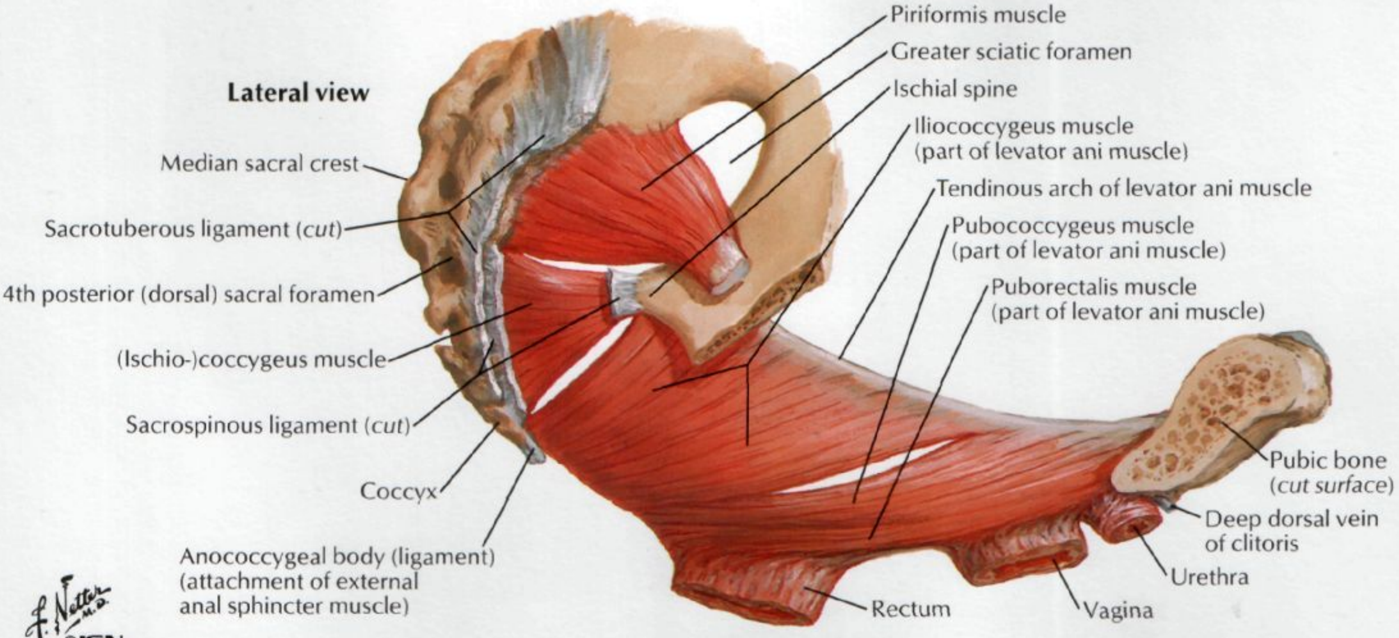
Pelvic Diaphragm: Female (continued)

FOR UROGENITAL DIAPHRAGM SEE PLATE 361

Inferior view


Pubic symphysis
Inferior (arcuate) pubic ligament
Deep dorsal vein of clitoris
Inferior pubic ramus
Urethra
Vagina
Rectum
Ischial spine
(Ischio-)coccygeus muscle
Piriformis muscle (*cut*)
Sacrospinous ligament (*cut*)
Sacrotuberous ligament (*cut*)
Sacrum
Musculofascial extensions to urethra
Musculofascial extensions to vagina
Interdigitating fibers of perineum
Puborectalis muscle (part of levator ani muscle)
Pubococcygeus muscle (part of levator ani muscle)
Tendinous arch of levator ani muscle
Obturator internus muscle
Iliococcygeus muscle (part of levator ani muscle)
Ischial tuberosity
Ischial spine
Obturator internus tendon
Sacrospinous ligament
Sacrotuberous ligament
Piriformis muscle
Levator plate (median raphe) of levator ani muscle
Anococcygeal body (ligament) (attachment of external anal sphincter muscle)
Tip of coccyx

Lateral view


Median sacral crest
Sacrotuberous ligament (*cut*)
4th posterior (dorsal) sacral foramen
(Ischio-)coccygeus muscle
Sacrospinous ligament (*cut*)
Coccyx
Anococcygeal body (ligament) (attachment of external anal sphincter muscle)
Piriformis muscle
Greater sciatic foramen
Ischial spine
Iliococcygeus muscle (part of levator ani muscle)
Tendinous arch of levator ani muscle
Pubococcygeus muscle (part of levator ani muscle)
Puborectalis muscle (part of levator ani muscle)
Pubic bone (*cut surface*)
Deep dorsal vein of clitoris
Urethra
Vagina
Rectum

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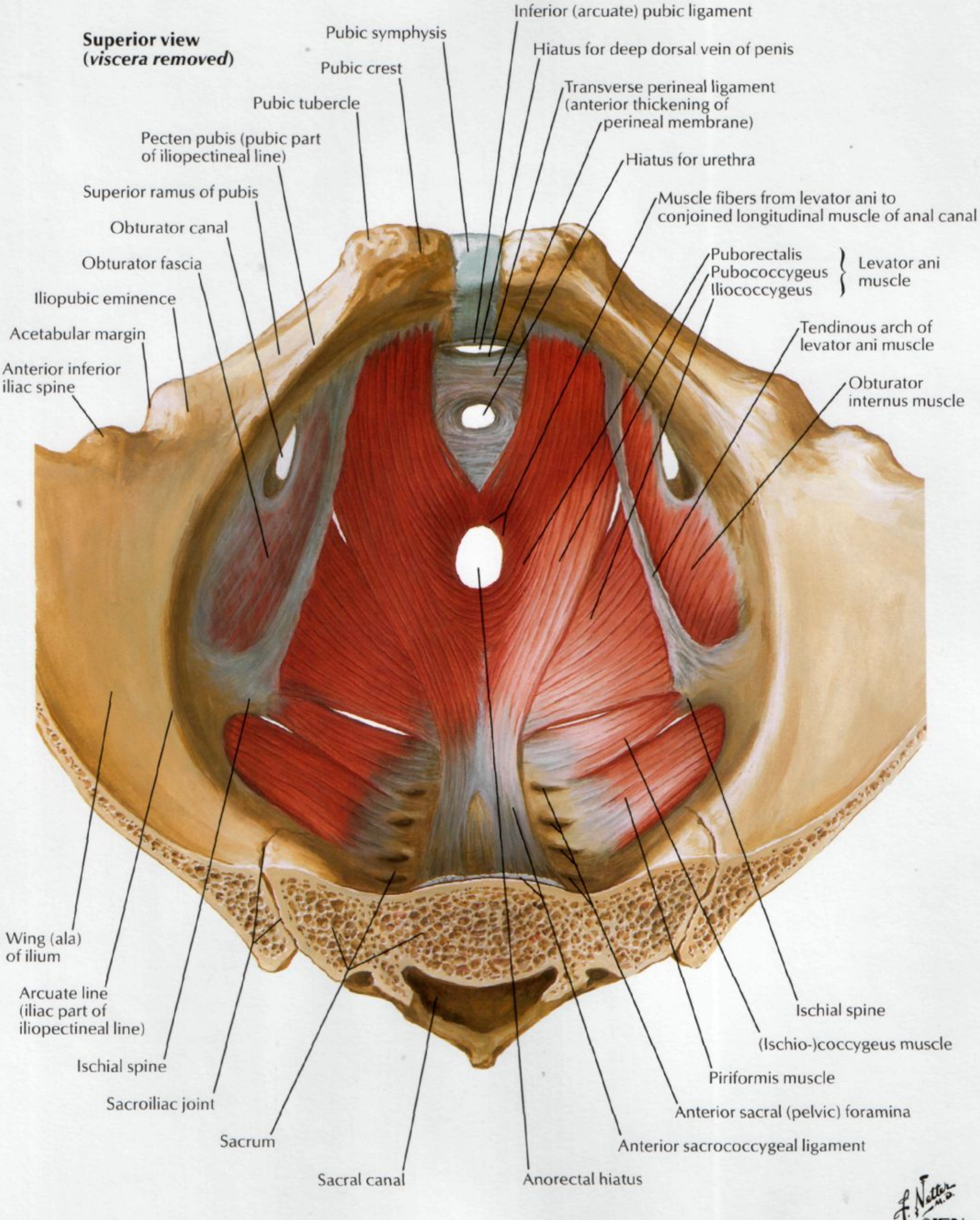
Pelvic Diaphragm: Male

SEE ALSO PLATES 255, 353, 373


Superior view
(*viscera removed*)
Inferior (arcuate) pubic ligament
Pubic symphysis
Hiatus for deep dorsal vein of penis
Pubic crest
Transverse perineal ligament (anterior thickening of perineal membrane)
Pubic tubercle
Pecten pubis (pubic part of iliopectineal line)
Hiatus for urethra
Superior ramus of pubis
Muscle fibers from levator ani to conjoined longitudinal muscle of anal canal
Obturator canal
Puborectalis
Pubococcygeus
Iliococcygeus
Levator ani muscle
Obturator fascia
Iliopubic eminence
Tendinous arch of levator ani muscle
Acetabular margin
Anterior inferior iliac spine
Obturator internus muscle
Wing (ala) of ilium
Arcuate line (iliac part of iliopectineal line)
Ischial spine
Ischial spine
(Ischio-)coccygeus muscle
Piriformis muscle
Sacroiliac joint
Anterior sacral (pelvic) foramina
Sacrum
Anterior sacrococcygeal ligament
Sacral canal
Anorectal hiatus
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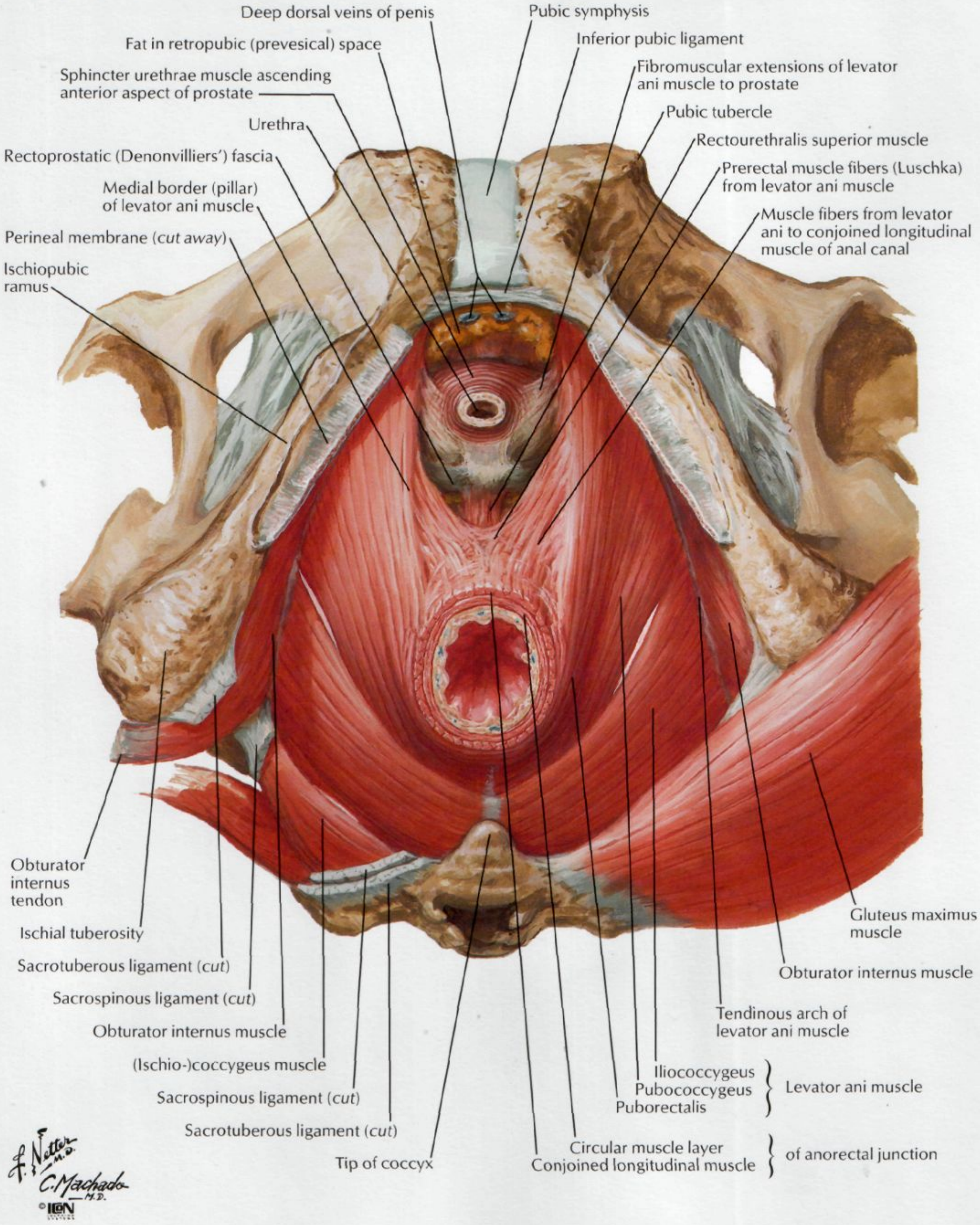
Pelvic Diaphragm: Male (continued)

FOR UROGENITAL DIAPHRAGM SEE PLATE 366

Inferior view


Deep dorsal veins of penis
Fat in retropubic (prevesical) space
Sphincter urethrae muscle ascending anterior aspect of prostate
Urethra
Rectoprostatic (Denonvilliers') fascia
Medial border (pillar) of levator ani muscle
Perineal membrane (*cut away*)
Ischiopubic ramus
Pubic symphysis
Inferior pubic ligament
Fibromuscular extensions of levator ani muscle to prostate
Pubic tubercle
Rectourethralis superior muscle
Prerectal muscle fibers (Luschka) from levator ani muscle
Muscle fibers from levator ani to conjoined longitudinal muscle of anal canal
Obturator internus tendon
Ischial tuberosity
Sacrotuberous ligament (*cut*)
Sacrospinous ligament (*cut*)
Obturator internus muscle
(Ischio-)coccygeus muscle
Sacrospinous ligament (*cut*)
Sacrotuberous ligament (*cut*)
Tip of coccyx
Gluteus maximus muscle
Obturator internus muscle
Tendinous arch of levator ani muscle
Iliococcygeus
Pubococcygeus
Puborectalis
Levator ani muscle
Circular muscle layer
Conjoined longitudinal muscle
of anorectal junction
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C. Machado M.D.
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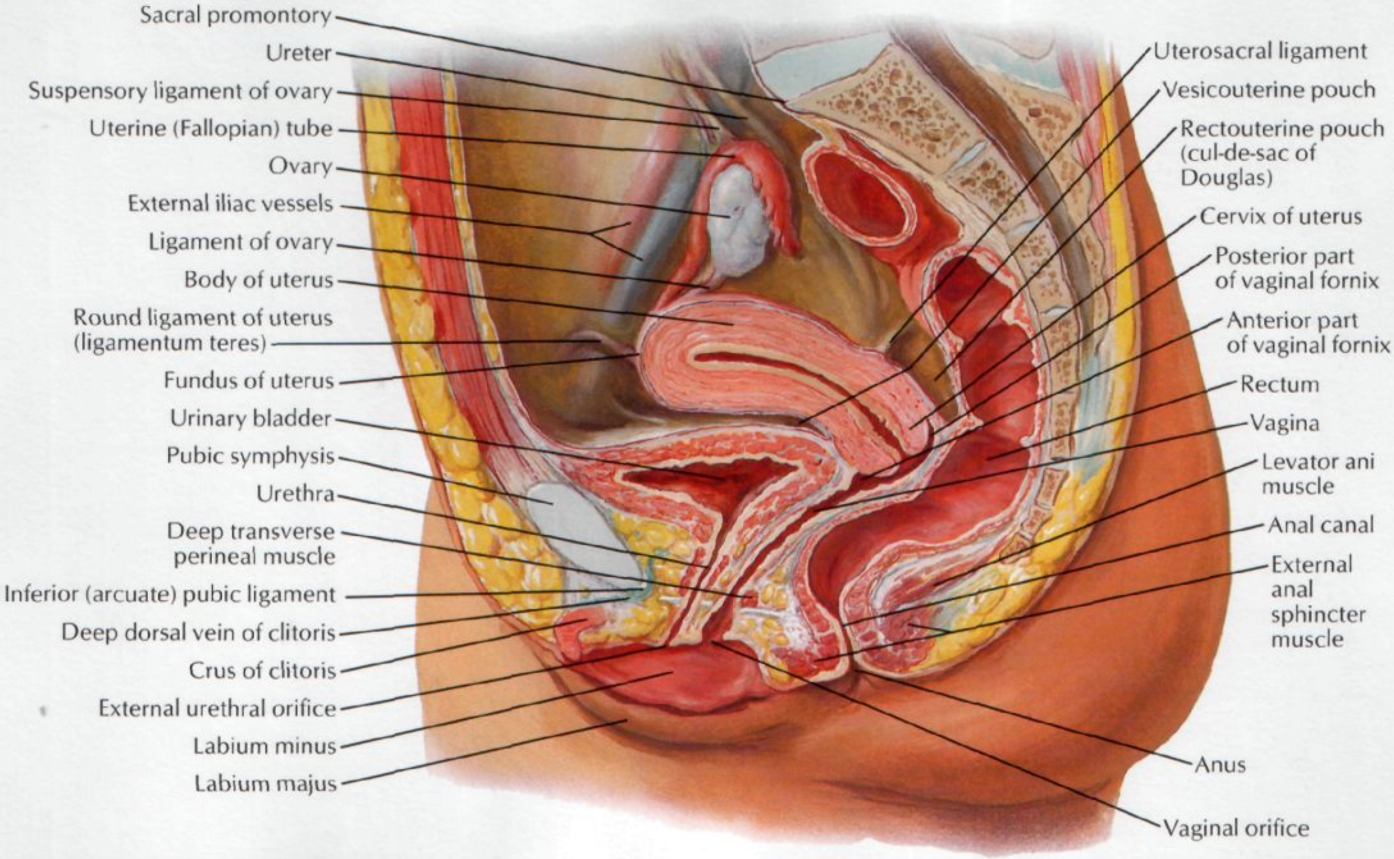
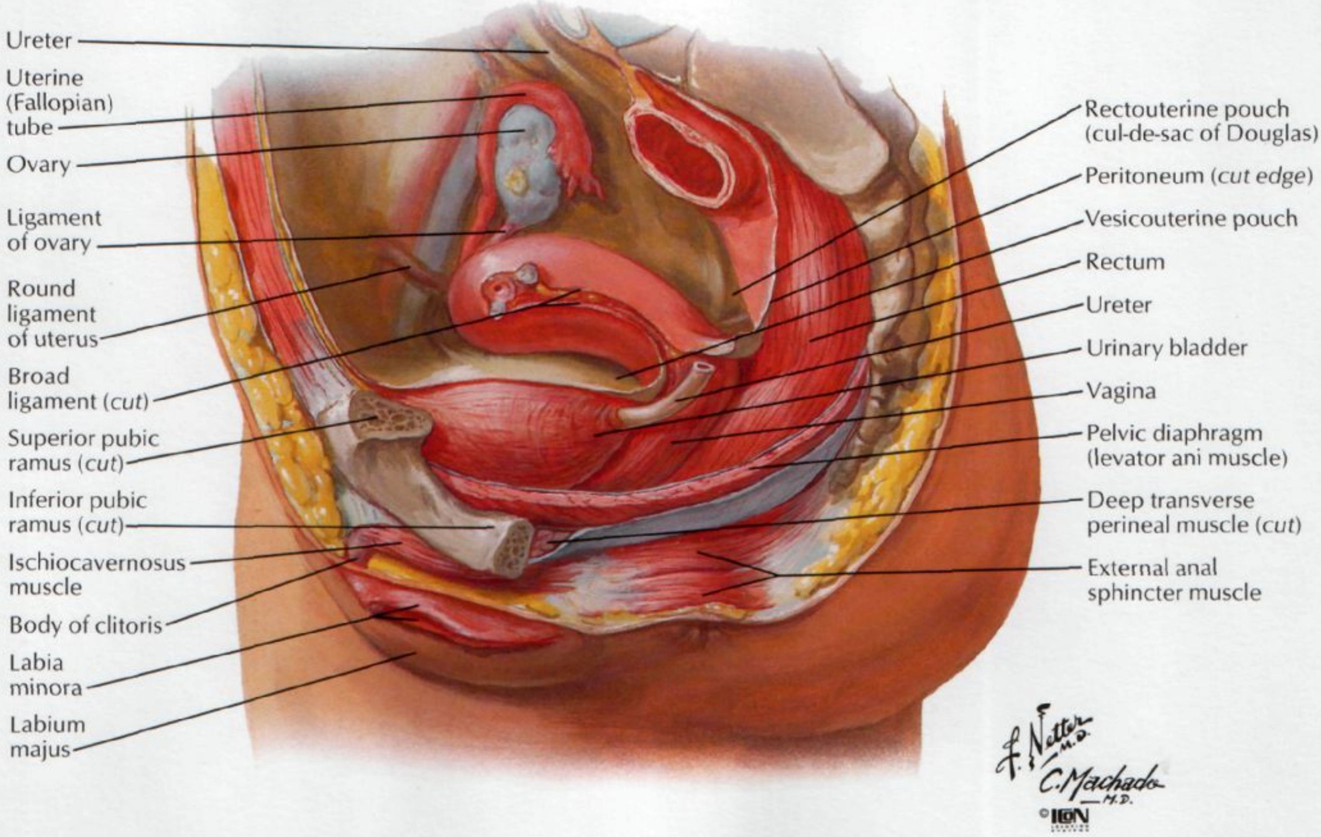
Pelvic Viscera and Perineum: Female

Median (sagittal) section

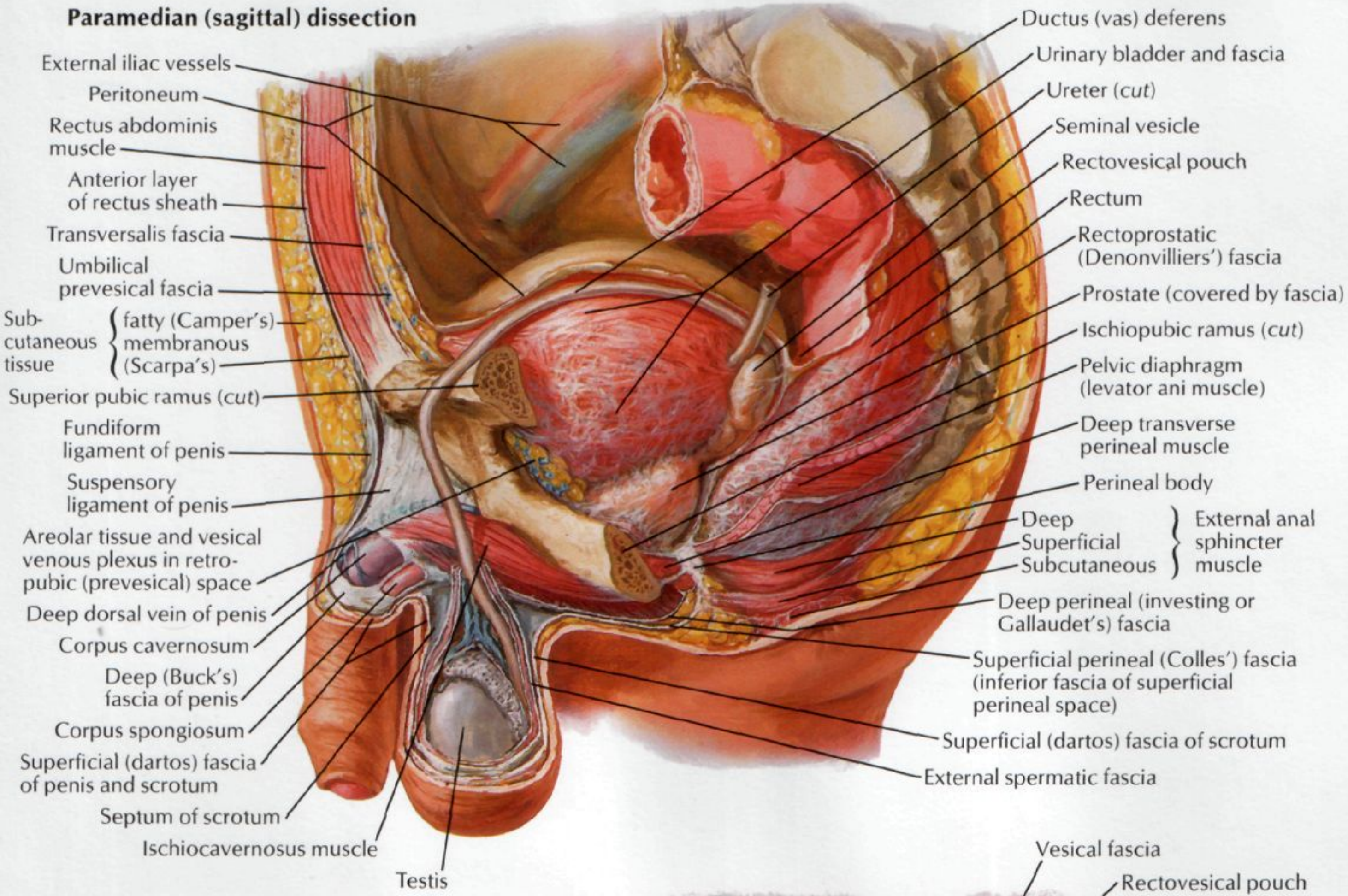

Sacral promontory
Ureter
Suspensory ligament of ovary
Uterine (Fallopian) tube
Ovary
External iliac vessels
Ligament of ovary
Body of uterus
Round ligament of uterus (ligamentum teres)
Fundus of uterus
Urinary bladder
Pubic symphysis
Urethra
Deep transverse perineal muscle
Inferior (arcuate) pubic ligament
Deep dorsal vein of clitoris
Crus of clitoris
External urethral orifice
Labium minus
Labium majus
Uterosacral ligament
Vesicouterine pouch
Rectouterine pouch (cul-de-sac of Douglas)
Cervix of uterus
Posterior part of vaginal fornix
Anterior part of vaginal fornix
Rectum
Vagina
Levator ani muscle
Anal canal
External anal sphincter muscle
Anus
Vaginal orifice

Paramedian (sagittal) dissection

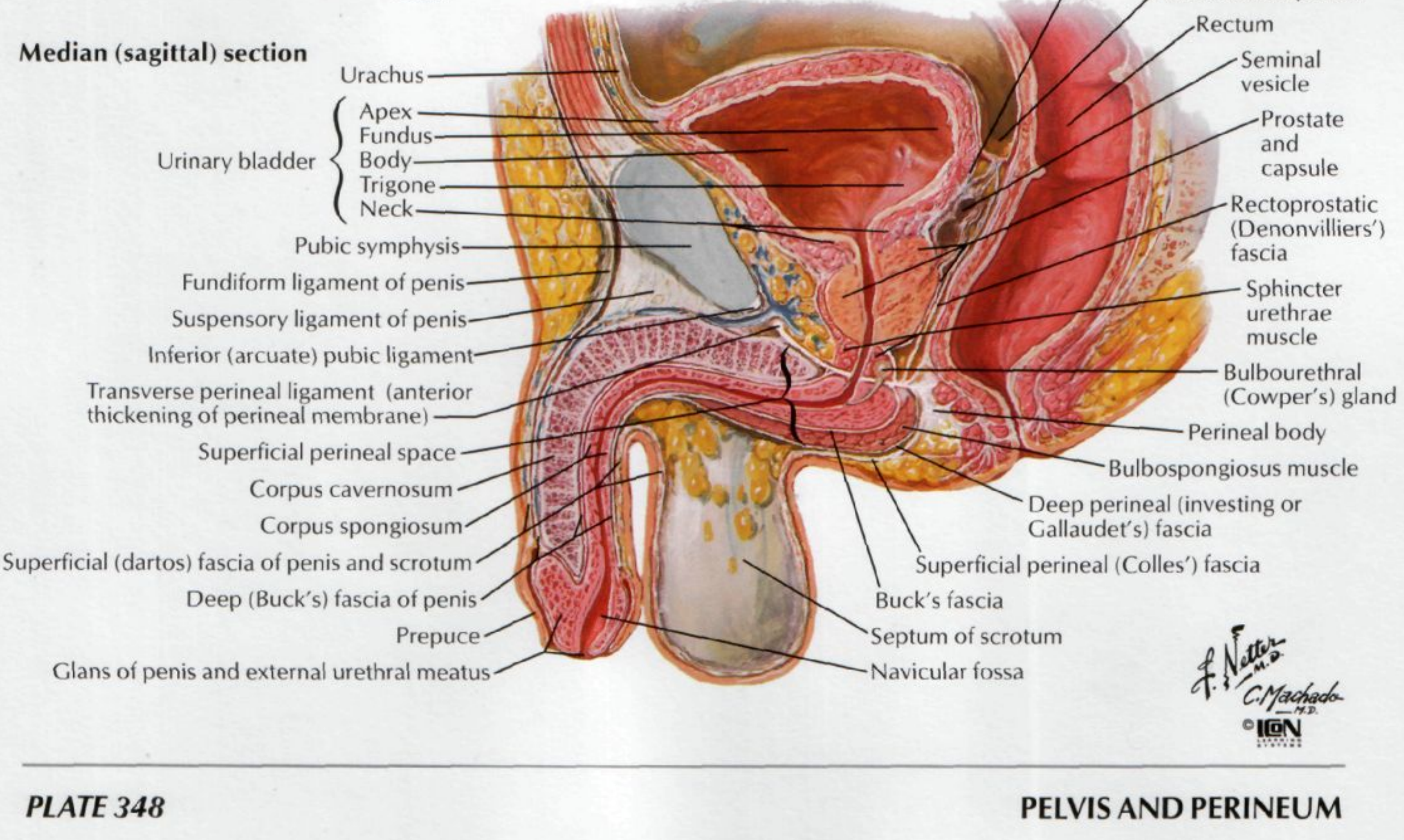


Pelvic Viscera and Perineum: Male

Paramedian (sagittal) dissection


External iliac vessels
Peritoneum
Rectus abdominis muscle
Anterior layer of rectus sheath
Transversalis fascia
Umbilical prevesical fascia
Sub-cutaneous tissue { fatty (Camper's) membranous (Scarpa's)
Superior pubic ramus (*cut*)
Fundiform ligament of penis
Suspensory ligament of penis
Areolar tissue and vesical venous plexus in retropubic (prevesical) space
Deep dorsal vein of penis
Corpus cavernosum
Deep (Buck's) fascia of penis
Corpus spongiosum
Superficial (dartos) fascia of penis and scrotum
Septum of scrotum
Ischiocavernosus muscle
Testis
Ductus (vas) deferens
Urinary bladder and fascia
Ureter (*cut*)
Seminal vesicle
Rectovesical pouch
Rectum
Rectoprostatic (Denonvilliers') fascia
Prostate (covered by fascia)
Ischiopubic ramus (*cut*)
Pelvic diaphragm (levator ani muscle)
Deep transverse perineal muscle
Perineal body
Deep
Superficial
Subcutaneous
} External anal sphincter muscle
Deep perineal (investing or Gallaudet's) fascia
Superficial perineal (Colles') fascia (inferior fascia of superficial perineal space)
Superficial (dartos) fascia of scrotum
External spermatic fascia

Median (sagittal) section


Urachus
Urinary bladder { Apex Fundus Body Trigone Neck
Pubic symphysis
Fundiform ligament of penis
Suspensory ligament of penis
Inferior (arcuate) pubic ligament
Transverse perineal ligament (anterior thickening of perineal membrane)
Superficial perineal space
Corpus cavernosum
Corpus spongiosum
Superficial (dartos) fascia of penis and scrotum
Deep (Buck's) fascia of penis
Prepuce
Glans of penis and external urethral meatus
Vesical fascia
Rectovesical pouch
Rectum
Seminal vesicle
Prostate and capsule
Rectoprostatic (Denonvilliers') fascia
Sphincter urethrae muscle
Bulbourethral (Cowper's) gland
Perineal body
Bulbospongiosus muscle
Deep perineal (investing or Gallaudet's) fascia
Superficial perineal (Colles') fascia
Buck's fascia
Septum of scrotum
Navicular fossa
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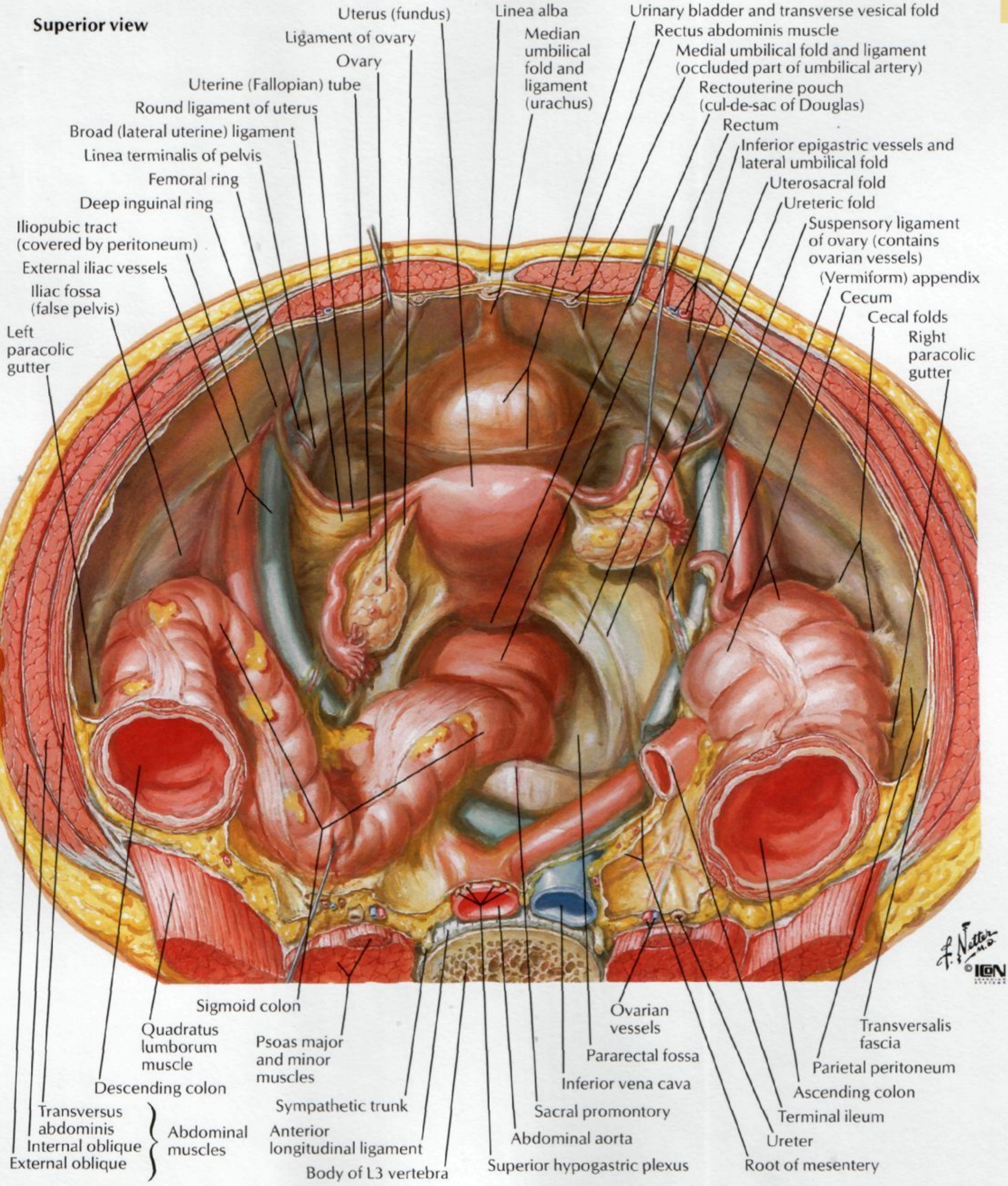
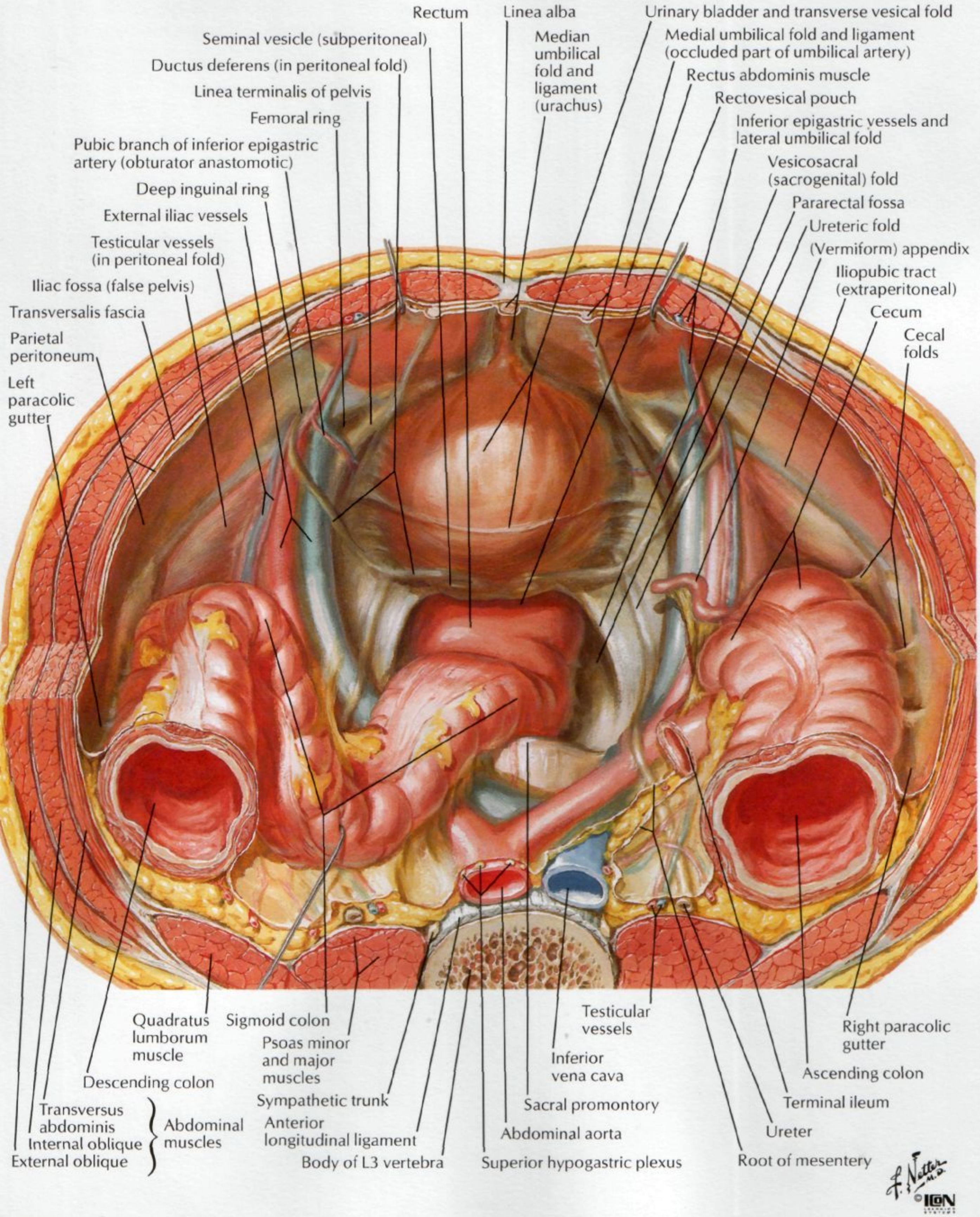
Pelvic Contents: Female

Superior view



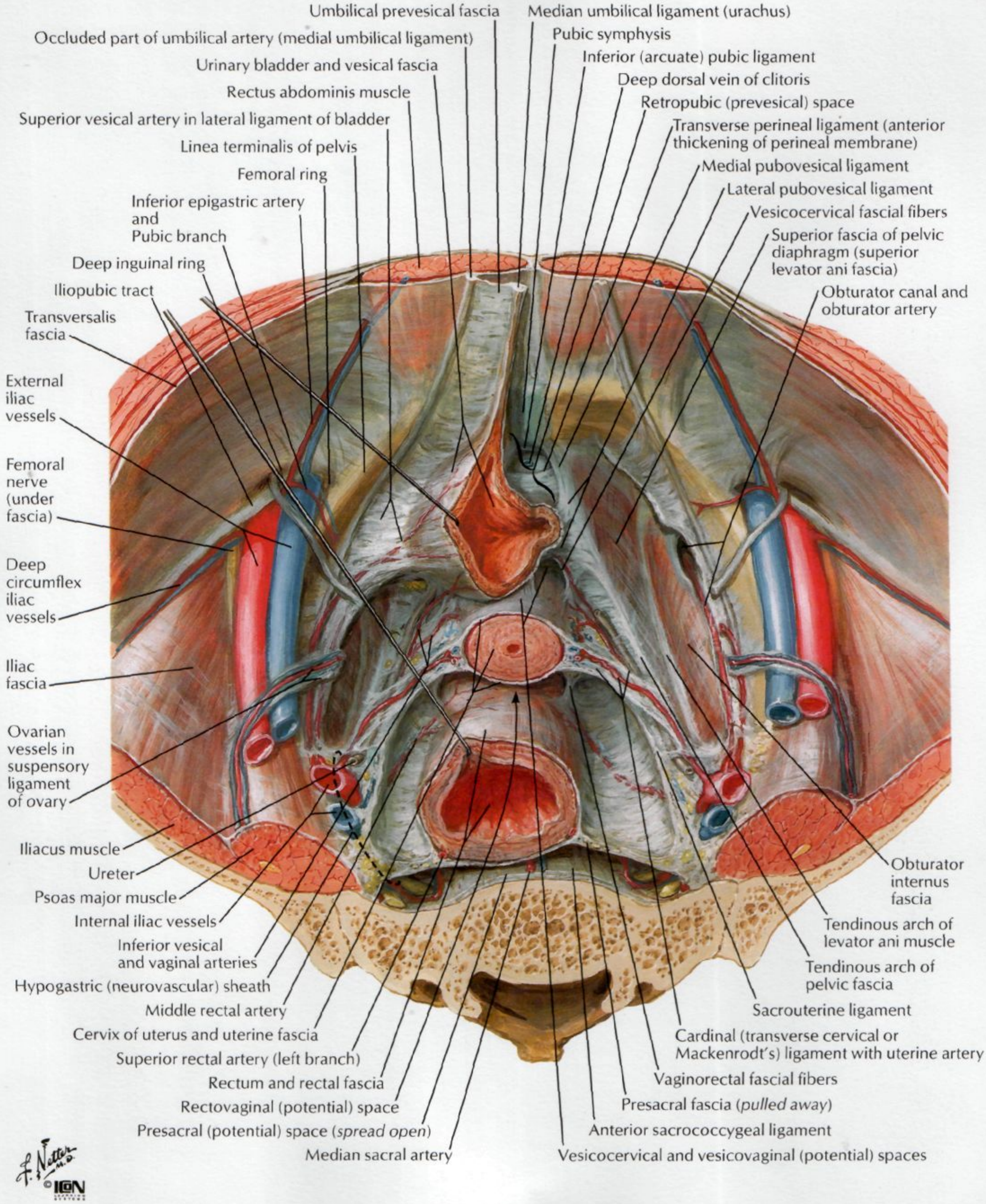
Pelvic Contents: Male

Superior view


Rectum
Linea alba
Urinary bladder and transverse vesical fold
Seminal vesicle (subperitoneal)
Median umbilical fold and ligament (urachus)
Medial umbilical fold and ligament (occluded part of umbilical artery)
Ductus deferens (in peritoneal fold)
Rectus abdominis muscle
Linea terminalis of pelvis
Rectovesical pouch
Femoral ring
Inferior epigastric vessels and lateral umbilical fold
Pubic branch of inferior epigastric artery (obturator anastomotic)
Vesicosacral (sacrogenital) fold
Deep inguinal ring
Pararectal fossa
External iliac vessels
Ureteric fold
Testicular vessels (in peritoneal fold)
(Vermiform) appendix
Iliac fossa (false pelvis)
Iliopubic tract (extraperitoneal)
Transversalis fascia
Cecum
Parietal peritoneum
Cecal folds
Left paracolic gutter
Quadratus lumborum muscle
Sigmoid colon
Psoas minor and major muscles
Testicular vessels
Right paracolic gutter
Inferior vena cava
Descending colon
Ascending colon
Sympathetic trunk
Sacral promontory
Terminal ileum
Transversus abdominis
Internal oblique
External oblique
Abdominal muscles
Anterior longitudinal ligament
Abdominal aorta
Ureter
Body of L3 vertebra
Superior hypogastric plexus
Root of mesentery

Endopelvic Fascia and Potential Spaces

Female: superior view (peritoneum and loose areolar tissue removed)


Umbilical prevesical fascia
Occluded part of umbilical artery (medial umbilical ligament)
Urinary bladder and vesical fascia
Rectus abdominis muscle
Superior vesical artery in lateral ligament of bladder
Linea terminalis of pelvis
Femoral ring
Inferior epigastric artery and Pubic branch
Deep inguinal ring
Iliopubic tract
Transversalis fascia
External iliac vessels
Femoral nerve (under fascia)
Deep circumflex iliac vessels
Iliac fascia
Ovarian vessels in suspensory ligament of ovary
Iliacus muscle
Ureter
Psoas major muscle
Internal iliac vessels
Inferior vesical and vaginal arteries
Hypogastric (neurovascular) sheath
Middle rectal artery
Cervix of uterus and uterine fascia
Superior rectal artery (left branch)
Rectum and rectal fascia
Rectovaginal (potential) space
Presacral (potential) space (*spread open*)
Median sacral artery
Median umbilical ligament (urachus)
Pubic symphysis
Inferior (arcuate) pubic ligament
Deep dorsal vein of clitoris
Retropubic (prevesical) space
Transverse perineal ligament (anterior thickening of perineal membrane)
Medial pubovesical ligament
Lateral pubovesical ligament
Vesicocervical fascial fibers
Superior fascia of pelvic diaphragm (superior levator ani fascia)
Obturator canal and obturator artery
Obturator internus fascia
Tendinous arch of levator ani muscle
Tendinous arch of pelvic fascia
Sacrouterine ligament
Cardinal (transverse cervical or Mackenrodt's) ligament with uterine artery
Vaginorectal fascial fibers
Presacral fascia (*pulled away*)
Anterior sacrococcygeal ligament
Vesicocervical and vesicovaginal (potential) spaces
F. Netter M.D.
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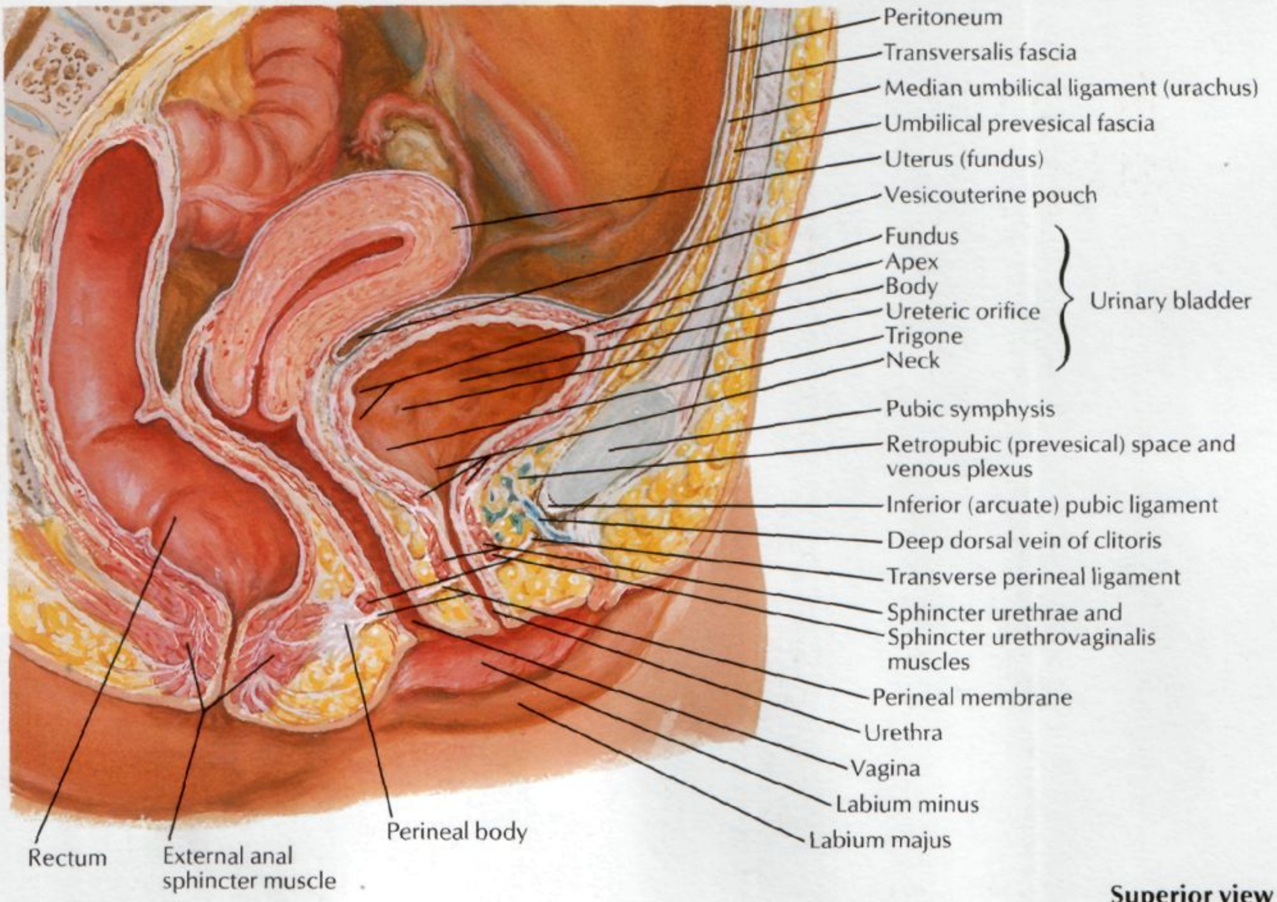
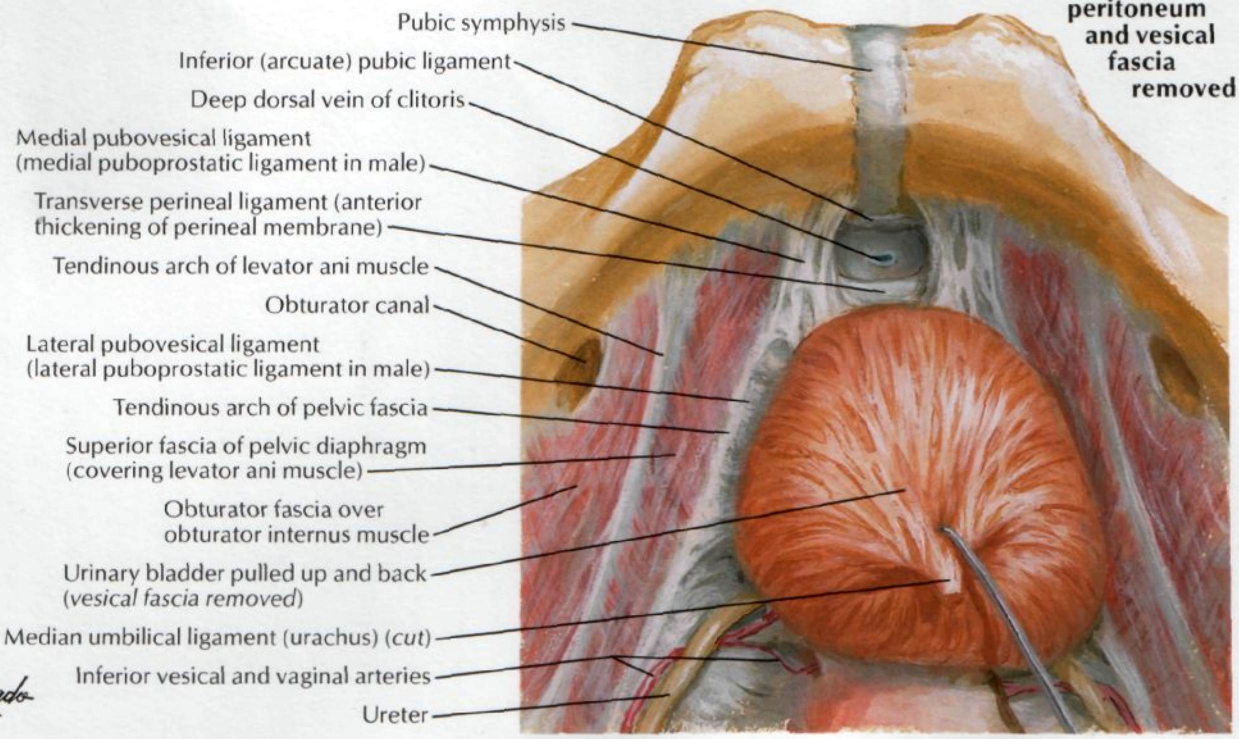
Urinary Bladder: Orientation and Supports

Female: midsagittal section


Peritoneum
Transversalis fascia
Median umbilical ligament (urachus)
Umbilical prevesical fascia
Uterus (fundus)
Vesicouterine pouch
Fundus
Apex
Body
Ureteric orifice
Trigone
Neck
Urinary bladder
Pubic symphysis
Retropubic (prevesical) space and venous plexus
Inferior (arcuate) pubic ligament
Deep dorsal vein of clitoris
Transverse perineal ligament
Sphincter urethrae and
Sphincter urethrovaginalis muscles
Perineal membrane
Urethra
Vagina
Labium minus
Labium majus
Rectum
External anal sphincter muscle
Perineal body

Superior view with peritoneum and vesical fascia removed


Pubic symphysis
Inferior (arcuate) pubic ligament
Deep dorsal vein of clitoris
Medial pubovesical ligament (medial puboprostatic ligament in male)
Transverse perineal ligament (anterior thickening of perineal membrane)
Tendinous arch of levator ani muscle
Obturator canal
Lateral pubovesical ligament (lateral puboprostatic ligament in male)
Tendinous arch of pelvic fascia
Superior fascia of pelvic diaphragm (covering levator ani muscle)
Obturator fascia over obturator internus muscle
Urinary bladder pulled up and back (*vesical fascia removed*)
Median umbilical ligament (urachus) (*cut*)
Inferior vesical and vaginal arteries
Ureter

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C.Machado M.D.
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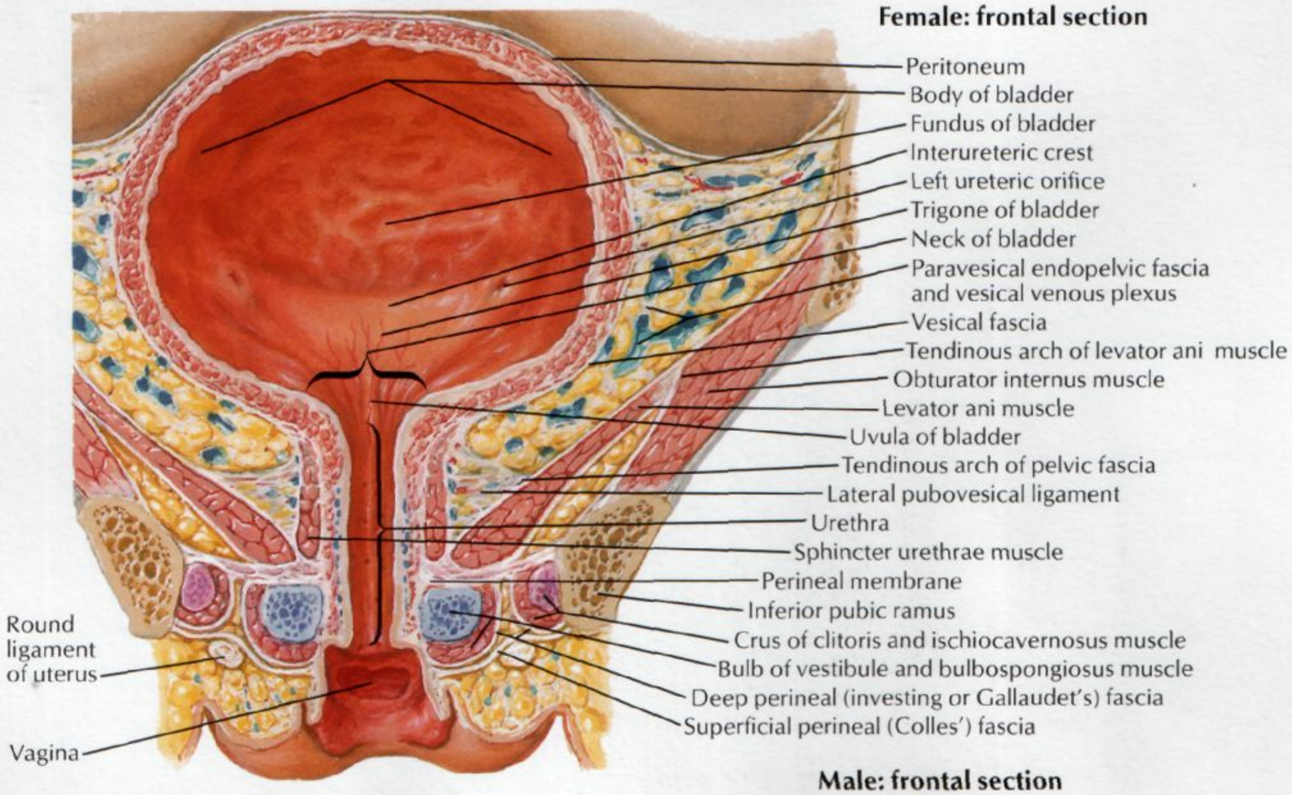
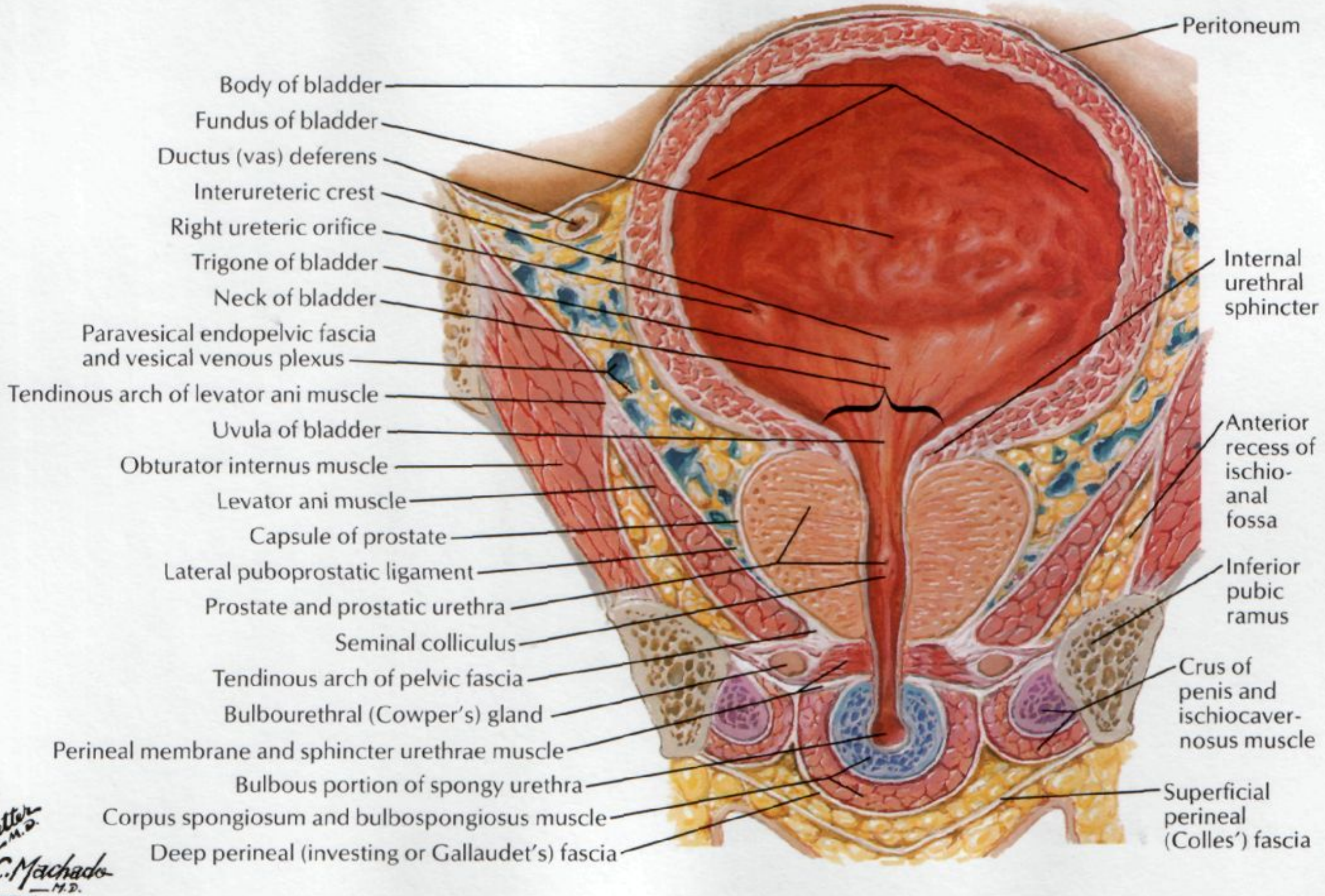
Urinary Bladder: Female and Male

SEE ALSO PLATES 329, 347, 348, 352, 380, 382, 383, 397

Female: frontal section


Peritoneum
Body of bladder
Fundus of bladder
Interureteric crest
Left ureteric orifice
Trigone of bladder
Neck of bladder
Paravesical endopelvic fascia and vesical venous plexus
Vesical fascia
Tendinous arch of levator ani muscle
Obturator internus muscle
Levator ani muscle
Uvula of bladder
Tendinous arch of pelvic fascia
Lateral pubovesical ligament
Urethra
Sphincter urethrae muscle
Perineal membrane
Inferior pubic ramus
Crus of clitoris and ischiocavernosus muscle
Bulb of vestibule and bulbospongiosus muscle
Deep perineal (investing or Gallaudet's) fascia
Superficial perineal (Colles') fascia
Round ligament of uterus
Vagina

Male: frontal section


Peritoneum
Body of bladder
Fundus of bladder
Ductus (vas) deferens
Interureteric crest
Right ureteric orifice
Trigone of bladder
Neck of bladder
Paravesical endopelvic fascia and vesical venous plexus
Tendinous arch of levator ani muscle
Uvula of bladder
Obturator internus muscle
Levator ani muscle
Capsule of prostate
Lateral puboprostatic ligament
Prostate and prostatic urethra
Seminal colliculus
Tendinous arch of pelvic fascia
Bulbourethral (Cowper's) gland
Perineal membrane and sphincter urethrae muscle
Bulbous portion of spongy urethra
Corpus spongiosum and bulbospongiosus muscle
Deep perineal (investing or Gallaudet's) fascia
Internal urethral sphincter
Anterior recess of ischio-anal fossa
Inferior pubic ramus
Crus of penis and ischiocavernosus muscle
Superficial perineal (Colles') fascia

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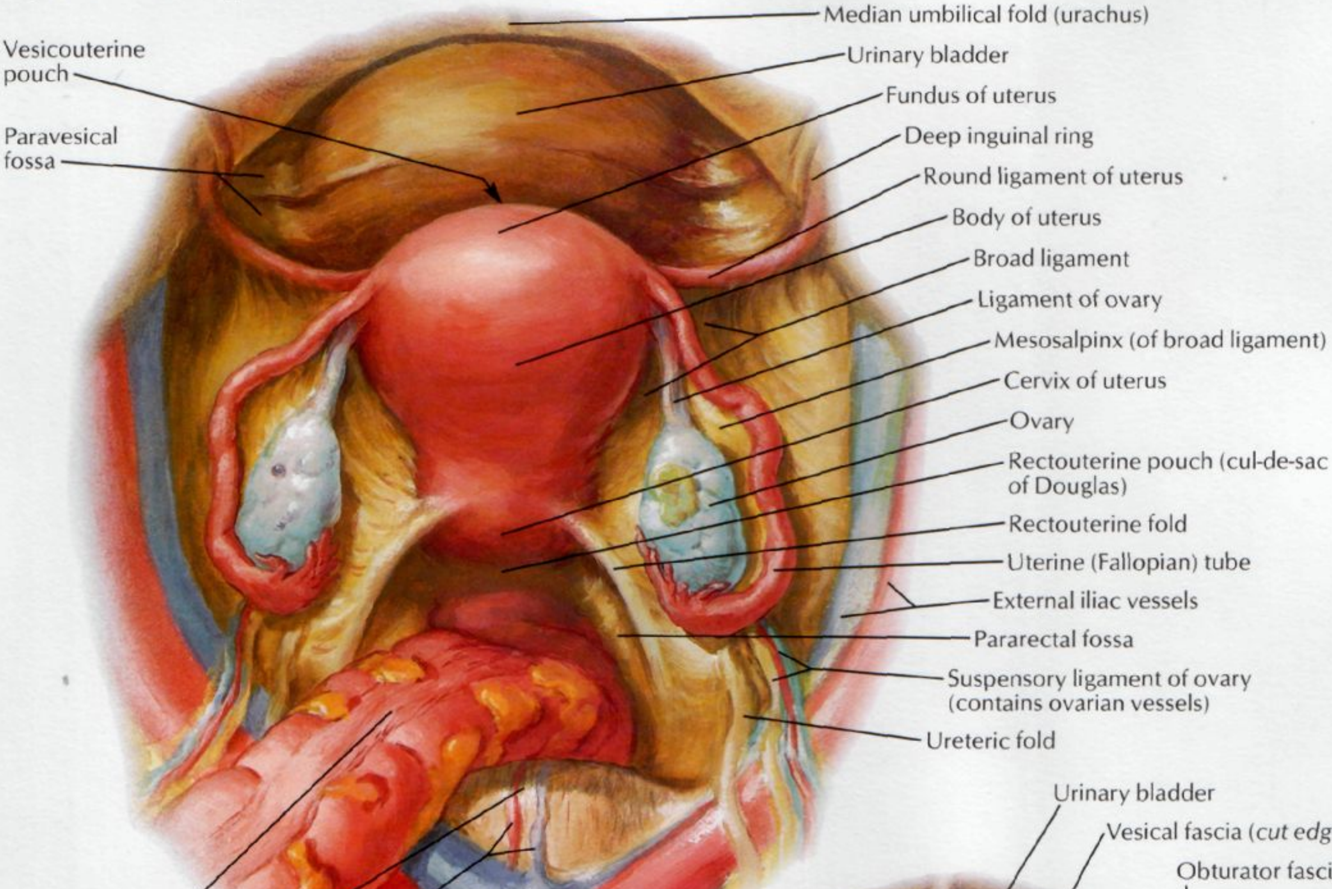
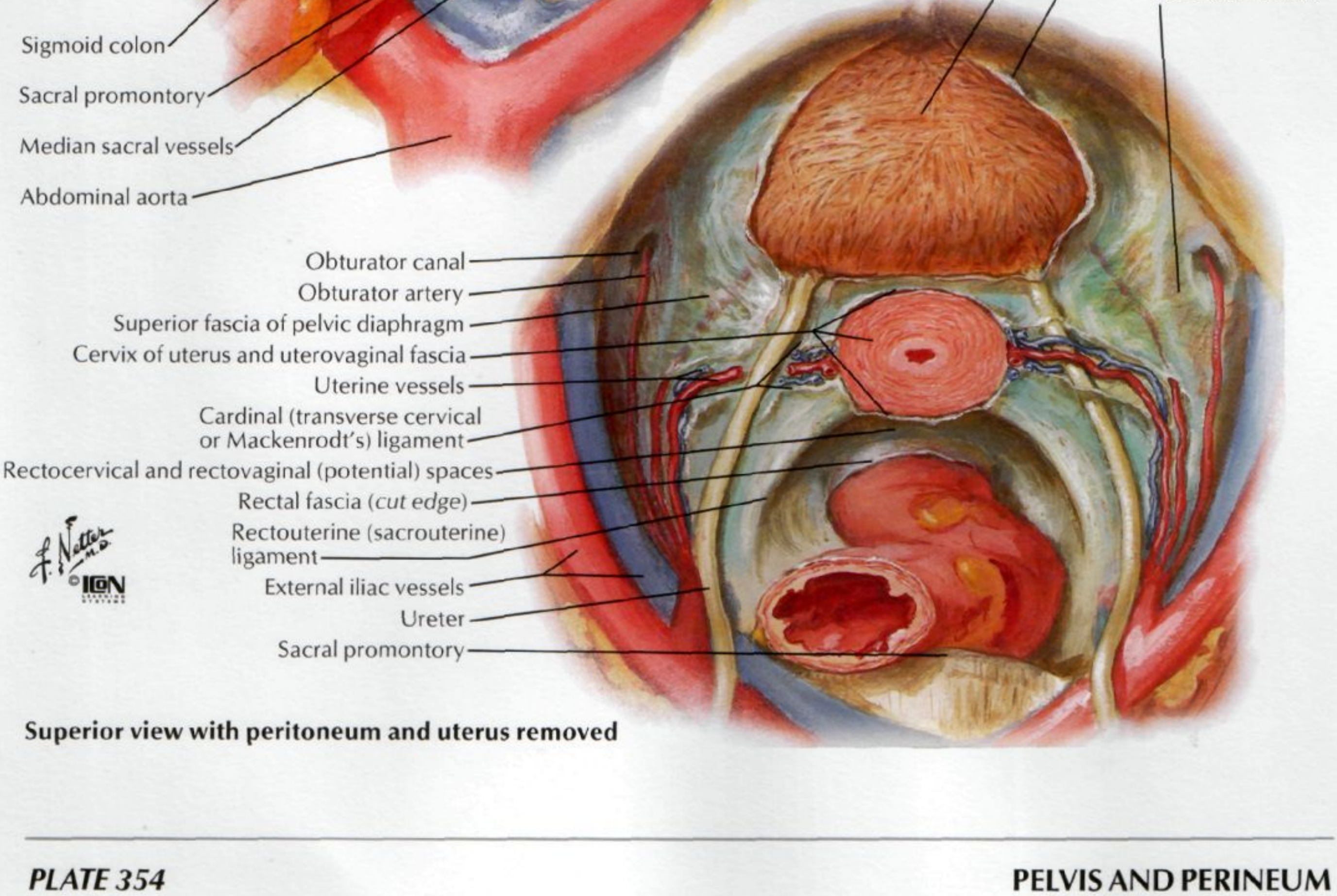
Pelvic Viscera: Female

Superior view with peritoneum intact





Urinary bladder
Vesical fascia (*cut edge*)
Obturator fascia
Obturator canal
Obturator artery
Superior fascia of pelvic diaphragm
Cervix of uterus and uterovaginal fascia
Uterine vessels
Cardinal (transverse cervical or Mackenrodt's) ligament
Rectocervical and rectovaginal (potential) spaces
Rectal fascia (*cut edge*)
Rectouterine (sacrouterine) ligament
External iliac vessels
Ureter
Sacral promontory
F. Netter M.D.
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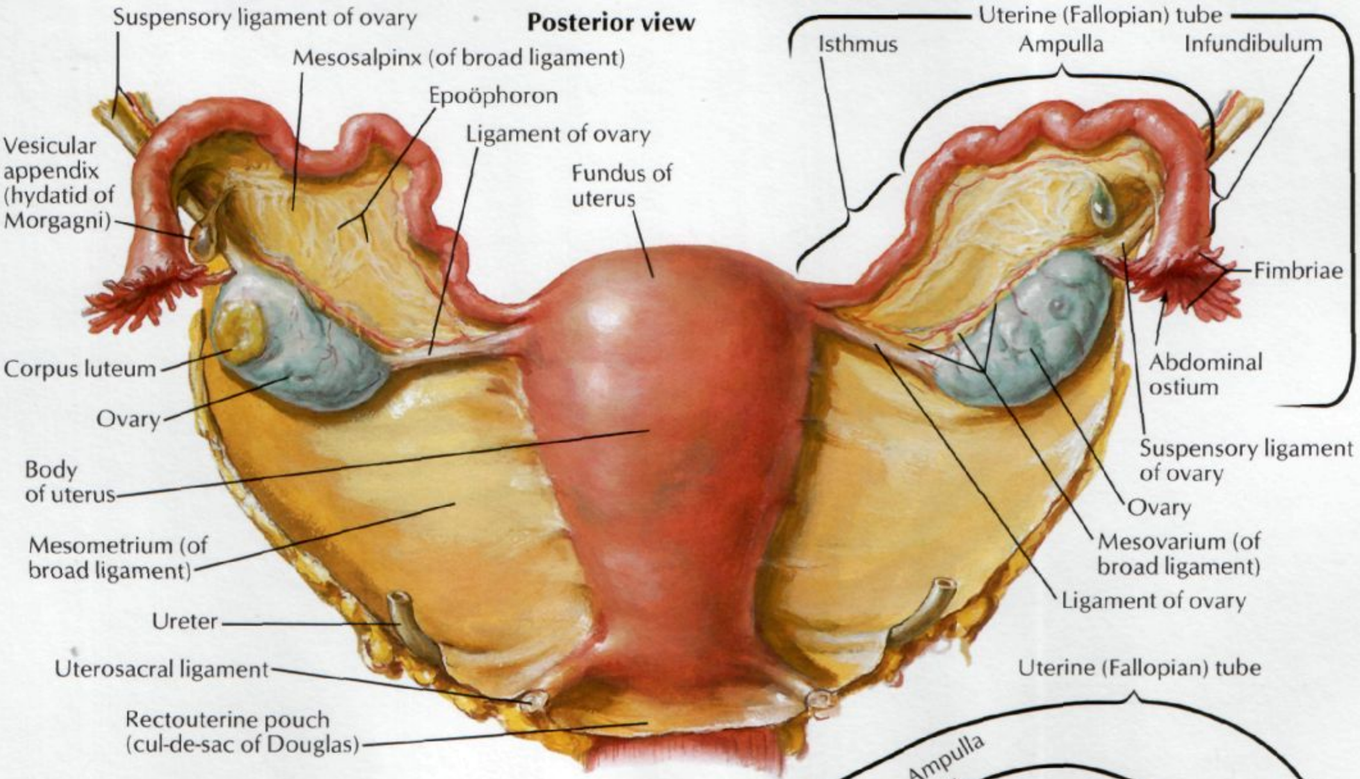
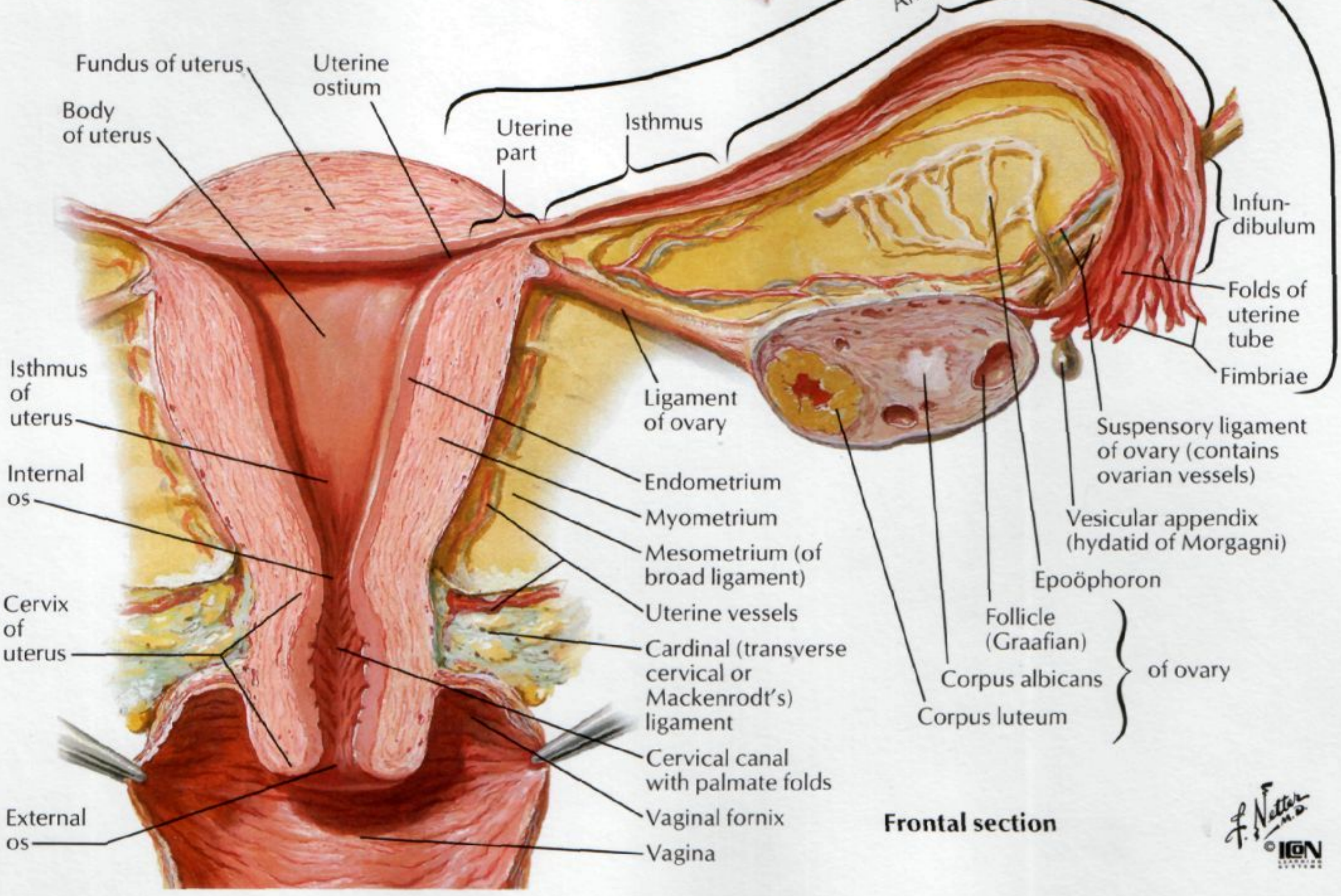
Superior view with peritoneum and uterus removed

Uterus and Adnexa



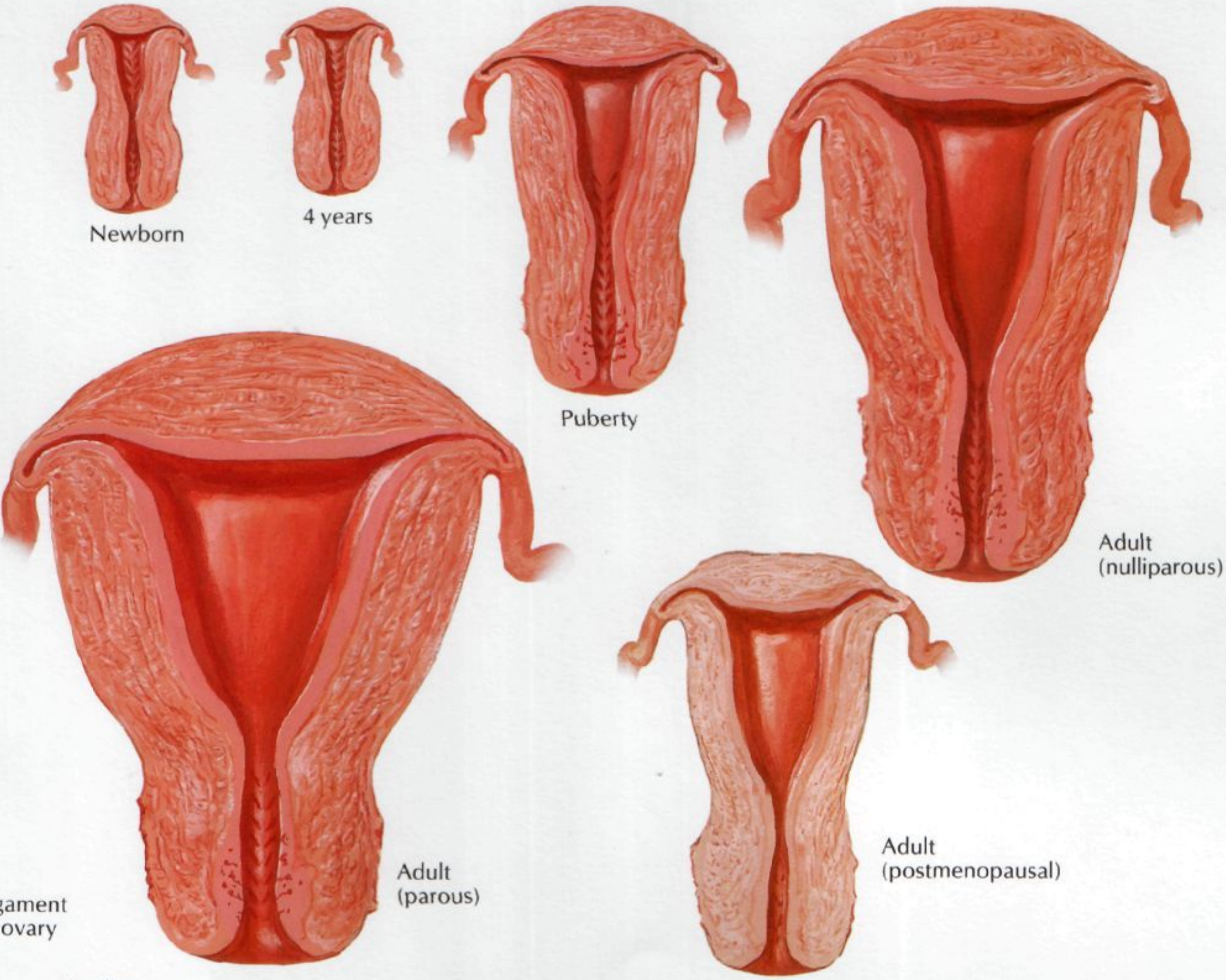
Posterior view

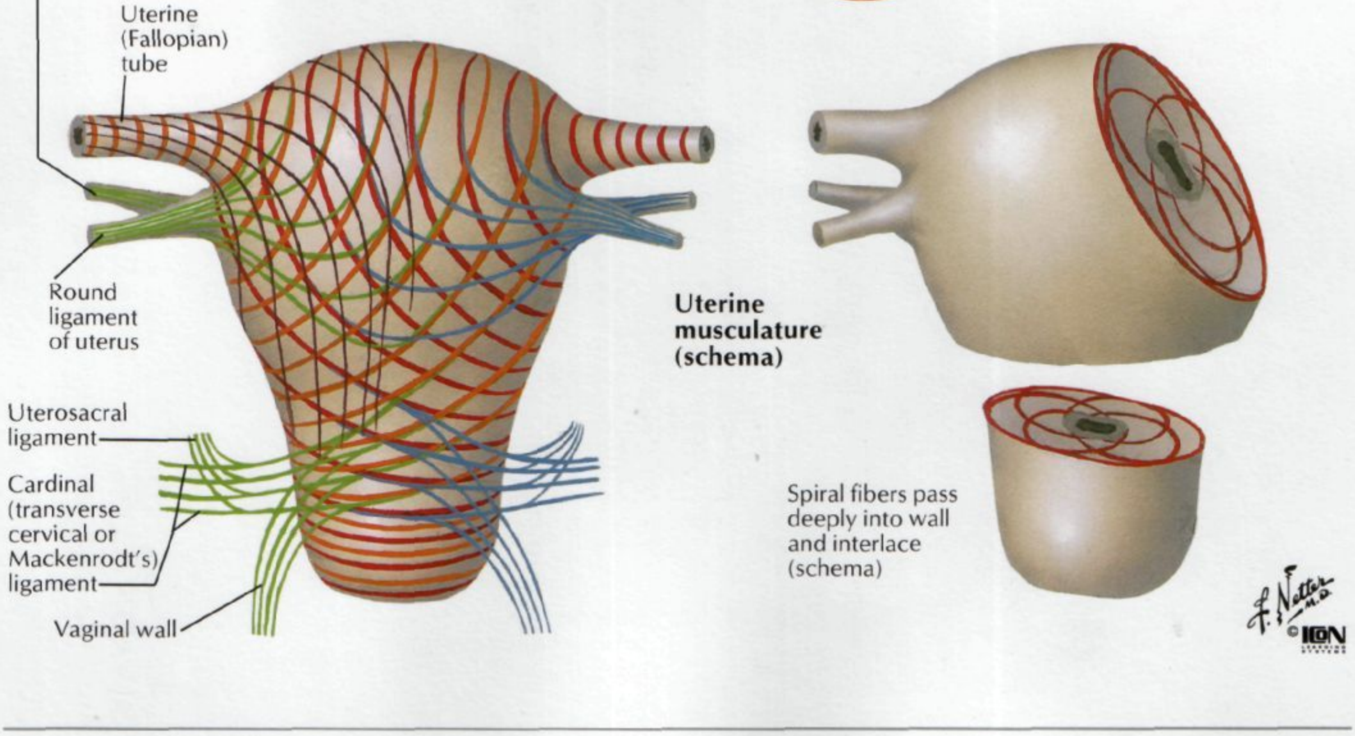
Suspensory ligament of ovary
Mesosalpinx (of broad ligament)
Epoöphoron
Ligament of ovary
Vesicular appendix (hydatid of Morgagni)
Fundus of uterus
Corpus luteum
Ovary
Body of uterus
Mesometrium (of broad ligament)
Ureter
Uterosacral ligament
Rectouterine pouch (cul-de-sac of Douglas)
Uterine (Fallopian) tube
Isthmus
Ampulla
Infundibulum
Fimbriae
Abdominal ostium
Suspensory ligament of ovary
Ovary
Mesovarium (of broad ligament)
Ligament of ovary



Frontal section

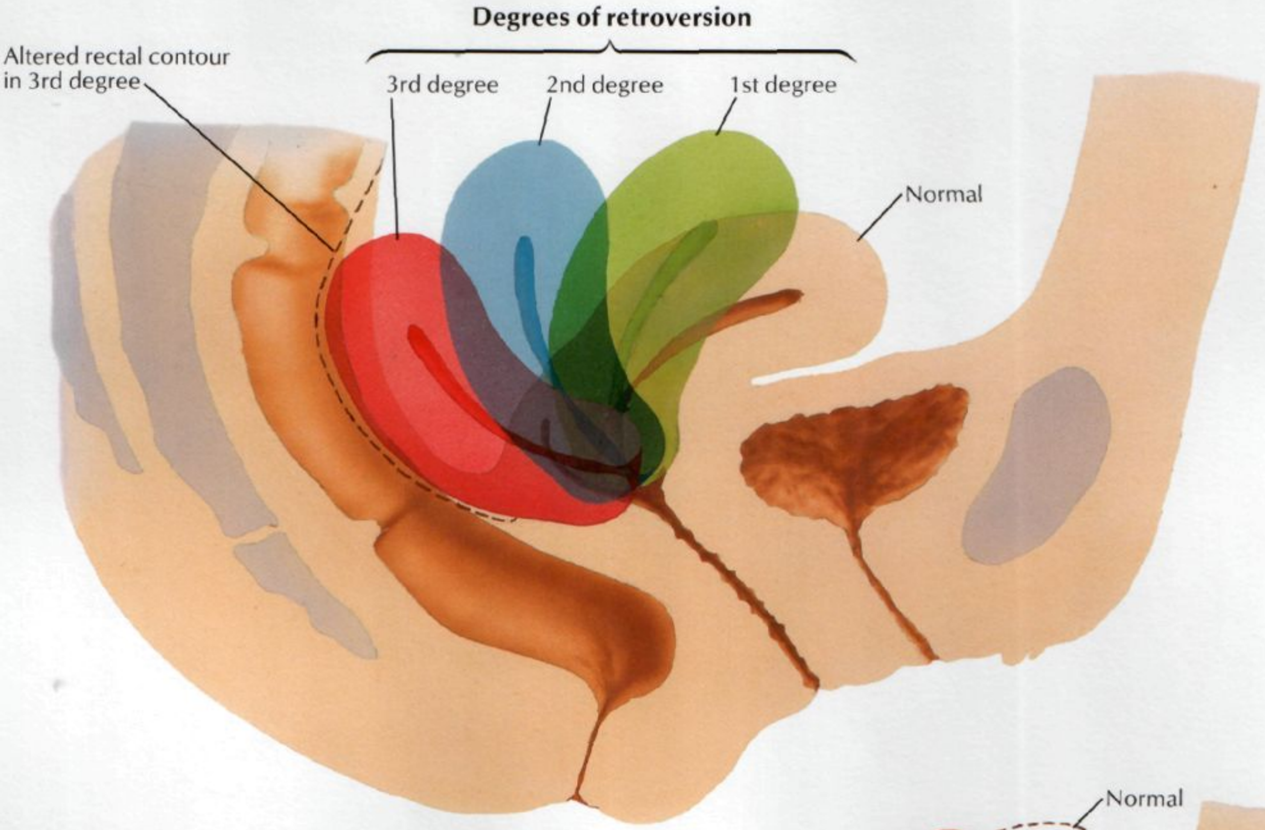
Uterus: Age Changes and Muscle Pattern

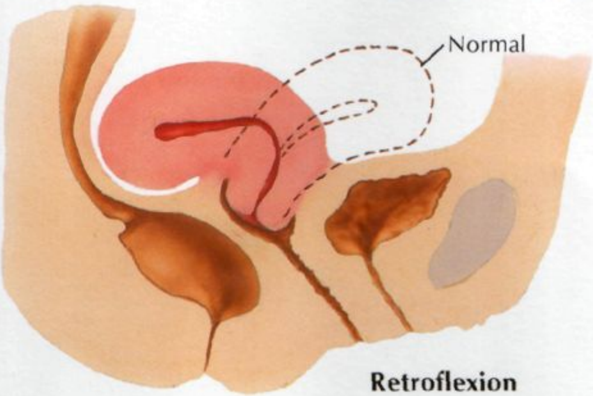



Ligament of ovary
Uterine (Fallopian) tube
Round ligament of uterus
Uterosacral ligament
Cardinal (transverse cervical or Mackenrodt's) ligament
Vaginal wall
Spiral fibers pass deeply into wall and interlace (schema)

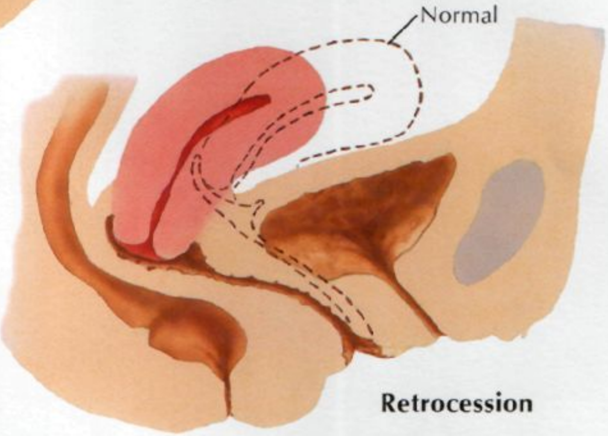
Uterine musculature (schema)

Uterus: Variations in Position

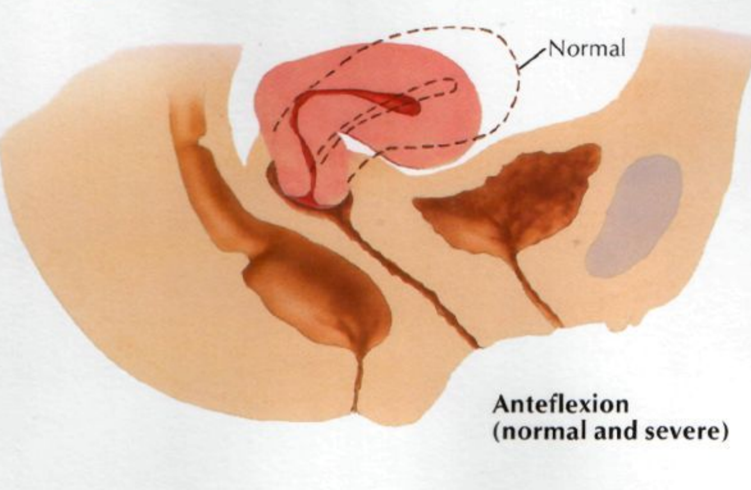

Degrees of retroversion
Altered rectal contour in 3rd degree
3rd degree
2nd degree
1st degree
Normal



Retroflexion



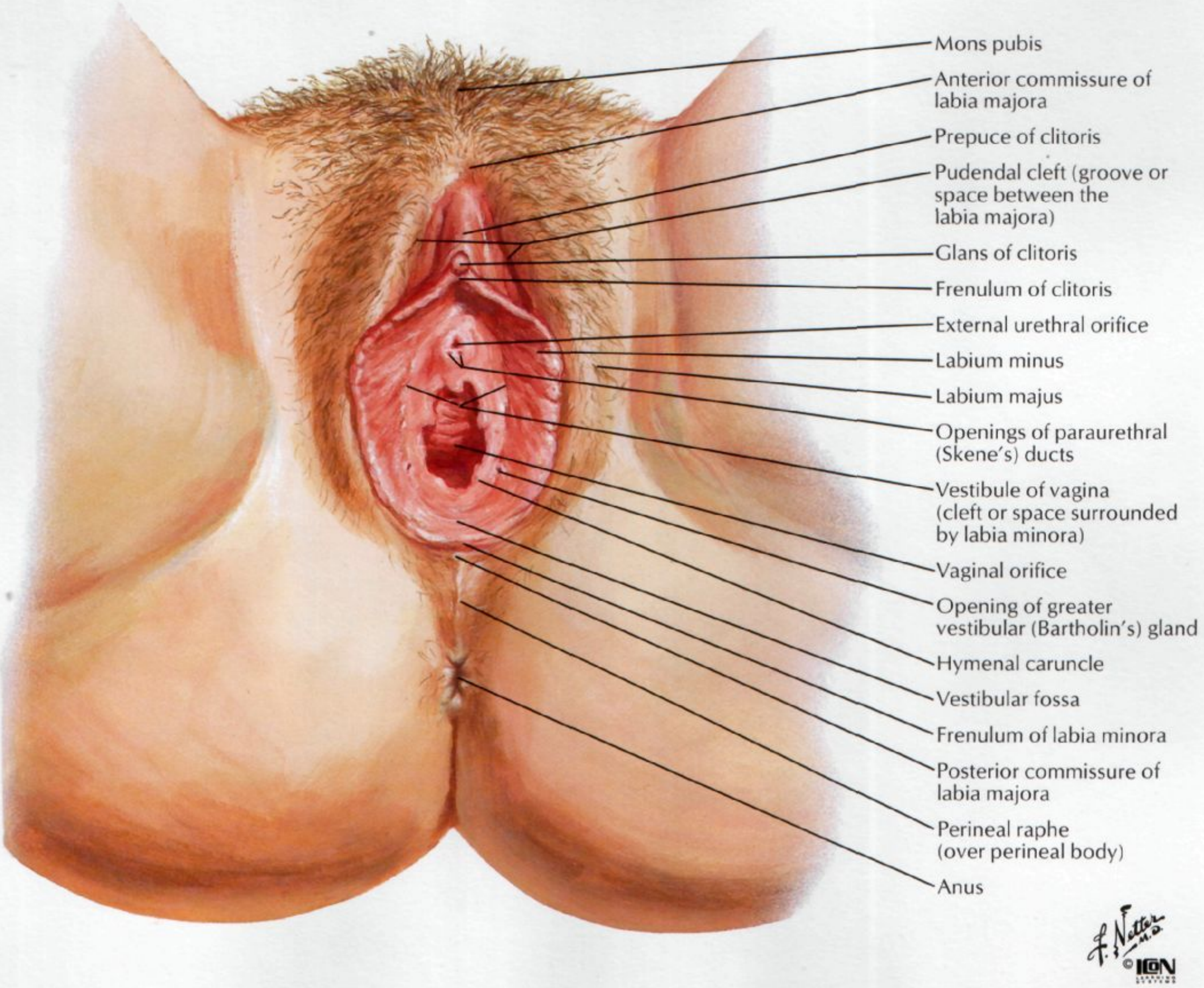
Retrocession



Anteflexion (normal and severe)

Perineum and External Genitalia (Pudendum or Vulva)

SEE ALSO PLATES 384, 386, 387, 393


Mons pubis
Anterior commissure of labia majora
Prepuce of clitoris
Pudendal cleft (groove or space between the labia majora)
Glans of clitoris
Frenulum of clitoris
External urethral orifice
Labium minus
Labium majus
Openings of paraurethral (Skene's) ducts
Vestibule of vagina (cleft or space surrounded by labia minora)
Vaginal orifice
Opening of greater vestibular (Bartholin's) gland
Hymenal caruncle
Vestibular fossa
Frenulum of labia minora
Posterior commissure of labia majora
Perineal raphe (over perineal body)
Anus
F. Netter M.D.
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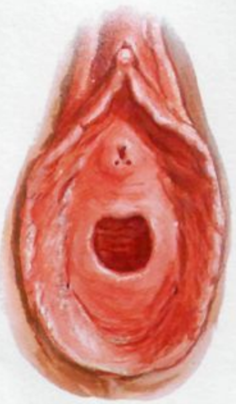
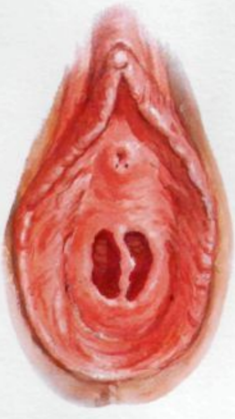
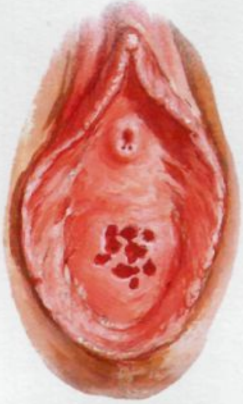


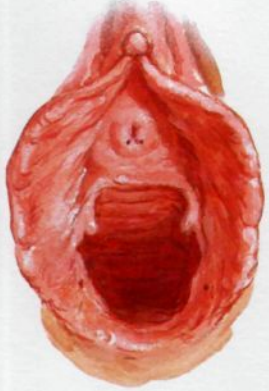
Anular hymen



Septate hymen

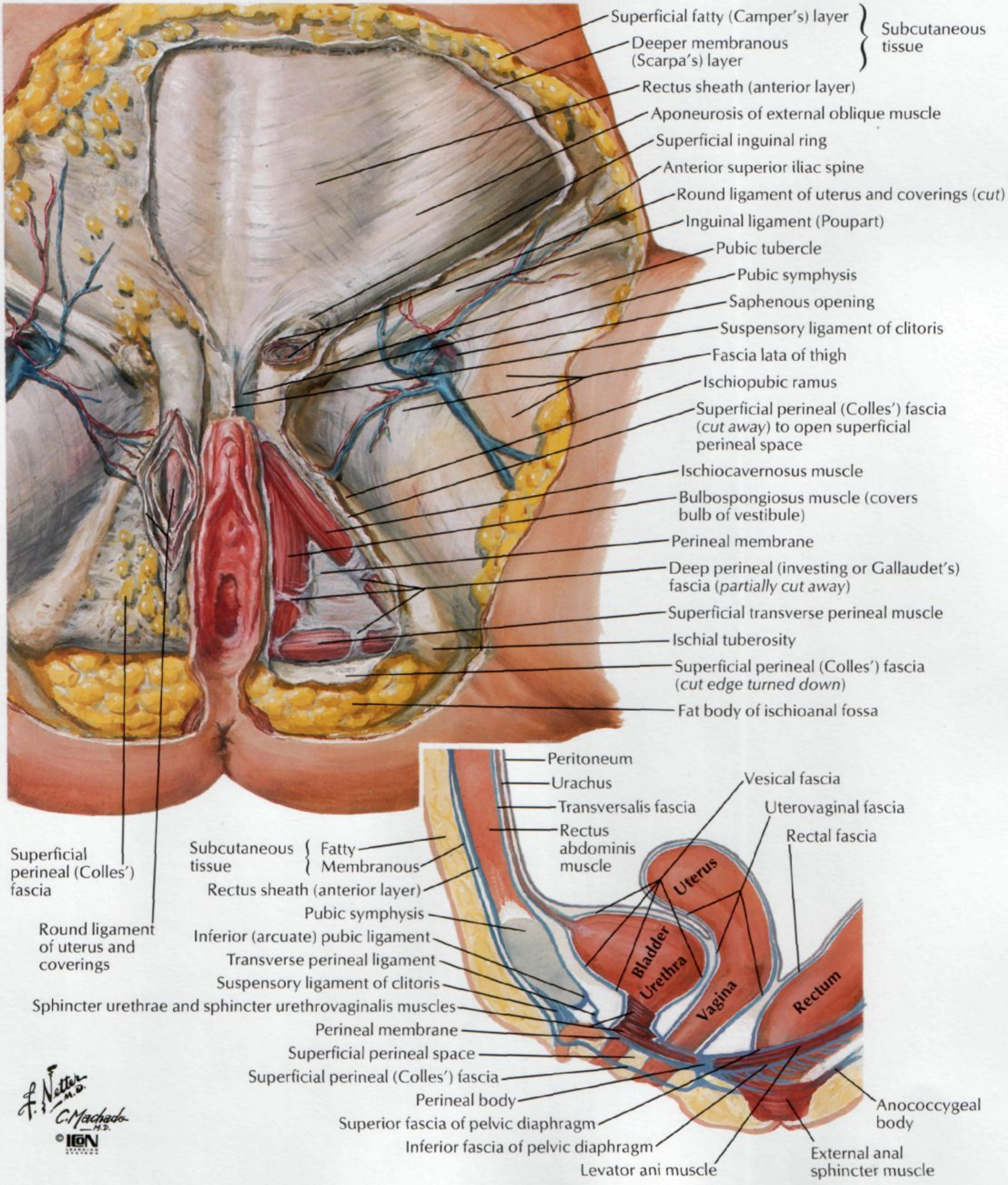


Cribriform hymen



Parous introitus

Perineum (Superficial Dissection)


Superficial fatty (Camper's) layer
Deeper membranous (Scarpa's) layer
Subcutaneous tissue
Rectus sheath (anterior layer)
Aponeurosis of external oblique muscle
Superficial inguinal ring
Anterior superior iliac spine
Round ligament of uterus and coverings (*cut*)
Inguinal ligament (Poupart)
Pubic tubercle
Pubic symphysis
Saphenous opening
Suspensory ligament of clitoris
Fascia lata of thigh
Ischiopubic ramus
Superficial perineal (Colles') fascia (*cut away*) to open superficial perineal space
Ischiocavernosus muscle
Bulbospongiosus muscle (covers bulb of vestibule)
Perineal membrane
Deep perineal (investing or Gallaudet's) fascia (*partially cut away*)
Superficial transverse perineal muscle
Ischial tuberosity
Superficial perineal (Colles') fascia (*cut edge turned down*)
Fat body of ischioanal fossa
Superficial perineal (Colles') fascia
Round ligament of uterus and coverings
Peritoneum
Urachus
Transversalis fascia
Rectus abdominis muscle
Vesical fascia
Uterovaginal fascia
Rectal fascia
Subcutaneous tissue { Fatty
Membranous
Rectus sheath (anterior layer)
Pubic symphysis
Inferior (arcuate) pubic ligament
Transverse perineal ligament
Suspensory ligament of clitoris
Sphincter urethrae and sphincter urethrovaginalis muscles
Perineal membrane
Superficial perineal space
Superficial perineal (Colles') fascia
Perineal body
Superior fascia of pelvic diaphragm
Inferior fascia of pelvic diaphragm
Levator ani muscle
External anal sphincter muscle
Anococcygeal body
Uterus
Bladder
Urethra
Vagina
Rectum
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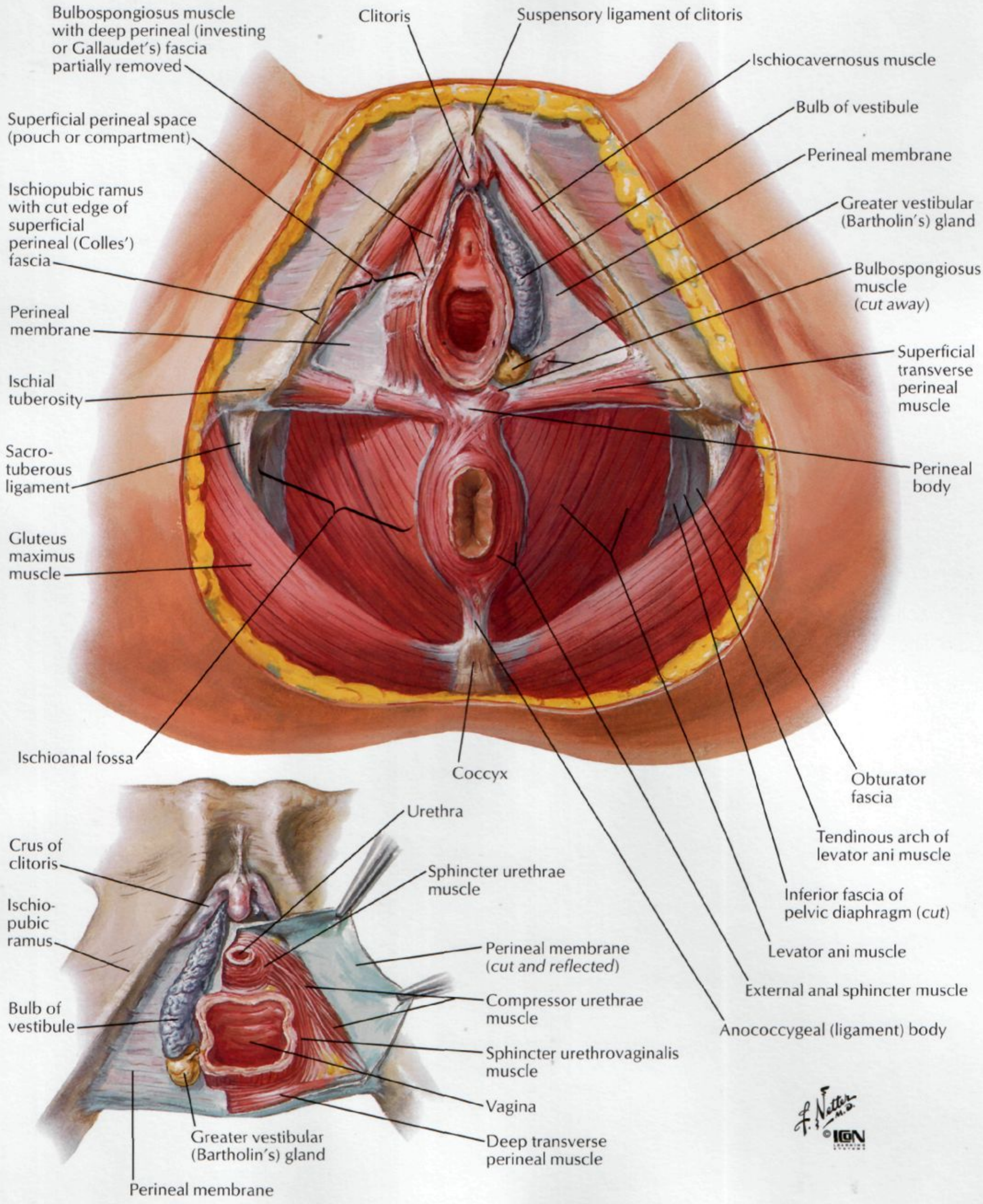
Perineum and Deep Perineum



Bulbospongiosus muscle with deep perineal (investing or Gallaudet's) fascia partially removed
Superficial perineal space (pouch or compartment)
Ischiopubic ramus with cut edge of superficial perineal (Colles') fascia
Perineal membrane
Ischial tuberosity
Sacro-tuberous ligament
Gluteus maximus muscle
Ischioanal fossa
Clitoris
Suspensory ligament of clitoris
Ischiocavernosus muscle
Bulb of vestibule
Perineal membrane
Greater vestibular (Bartholin's) gland
Bulbospongiosus muscle (*cut away*)
Superficial transverse perineal muscle
Perineal body
Coccyx
Obturator fascia
Tendinous arch of levator ani muscle
Inferior fascia of pelvic diaphragm (*cut*)
Levator ani muscle
External anal sphincter muscle
Anococcygeal (ligament) body
Crus of clitoris
Ischio-pubic ramus
Bulb of vestibule
Urethra
Sphincter urethrae muscle
Perineal membrane (*cut and reflected*)
Compressor urethrae muscle
Sphincter urethrovaginalis muscle
Vagina
Deep transverse perineal muscle
Greater vestibular (Bartholin's) gland
Perineal membrane
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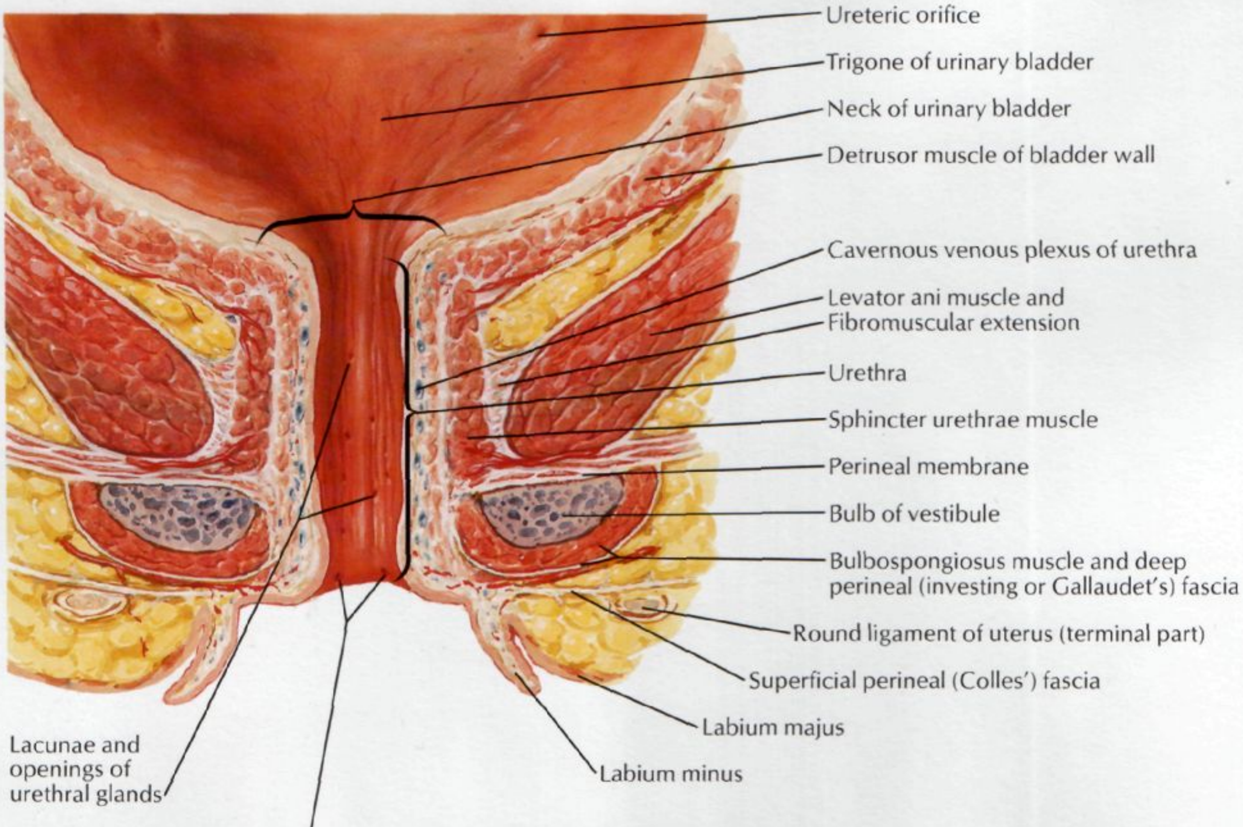
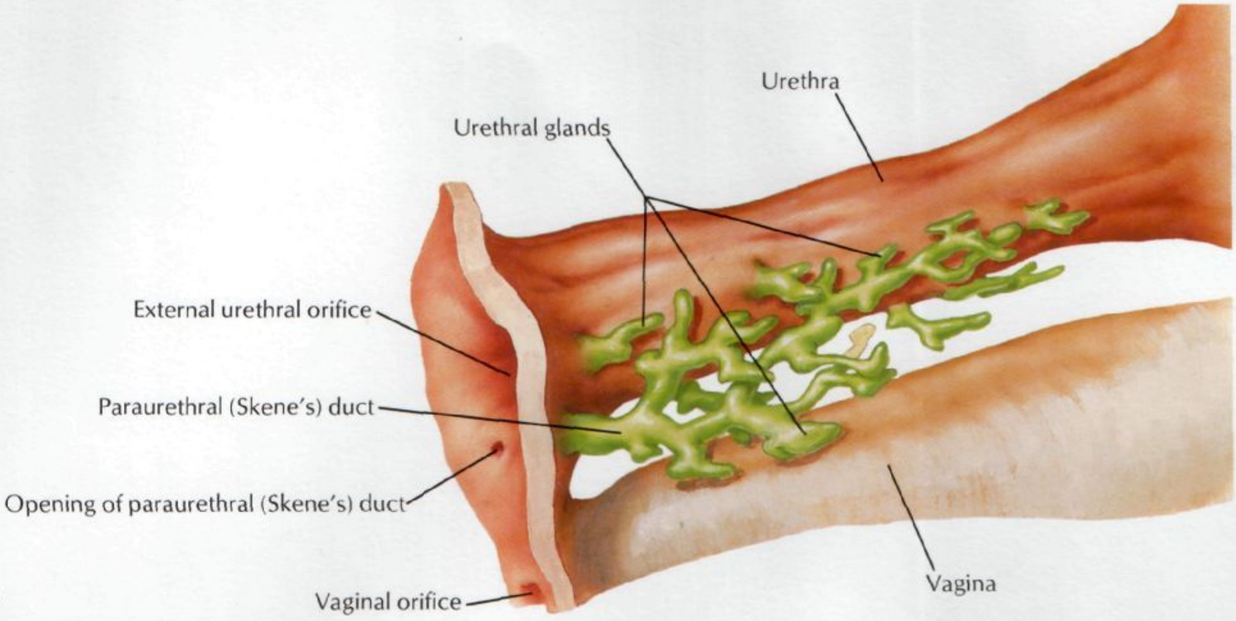
Female Urethra

SEE ALSO PLATES 347, 352


Ureteric orifice
Trigone of urinary bladder
Neck of urinary bladder
Detrusor muscle of bladder wall
Cavernous venous plexus of urethra
Levator ani muscle and
Fibromuscular extension
Urethra
Sphincter urethrae muscle
Perineal membrane
Bulb of vestibule
Bulbospongiosus muscle and deep perineal (investing or Gallaudet's) fascia
Round ligament of uterus (terminal part)
Superficial perineal (Colles') fascia
Labium majus
Labium minus
Lacunae and openings of urethral glands
Openings of paraurethral (Skene's) ducts

Frontal section, anterior view


Urethra
Urethral glands
External urethral orifice
Paraurethral (Skene's) duct
Opening of paraurethral (Skene's) duct
Vaginal orifice
Vagina

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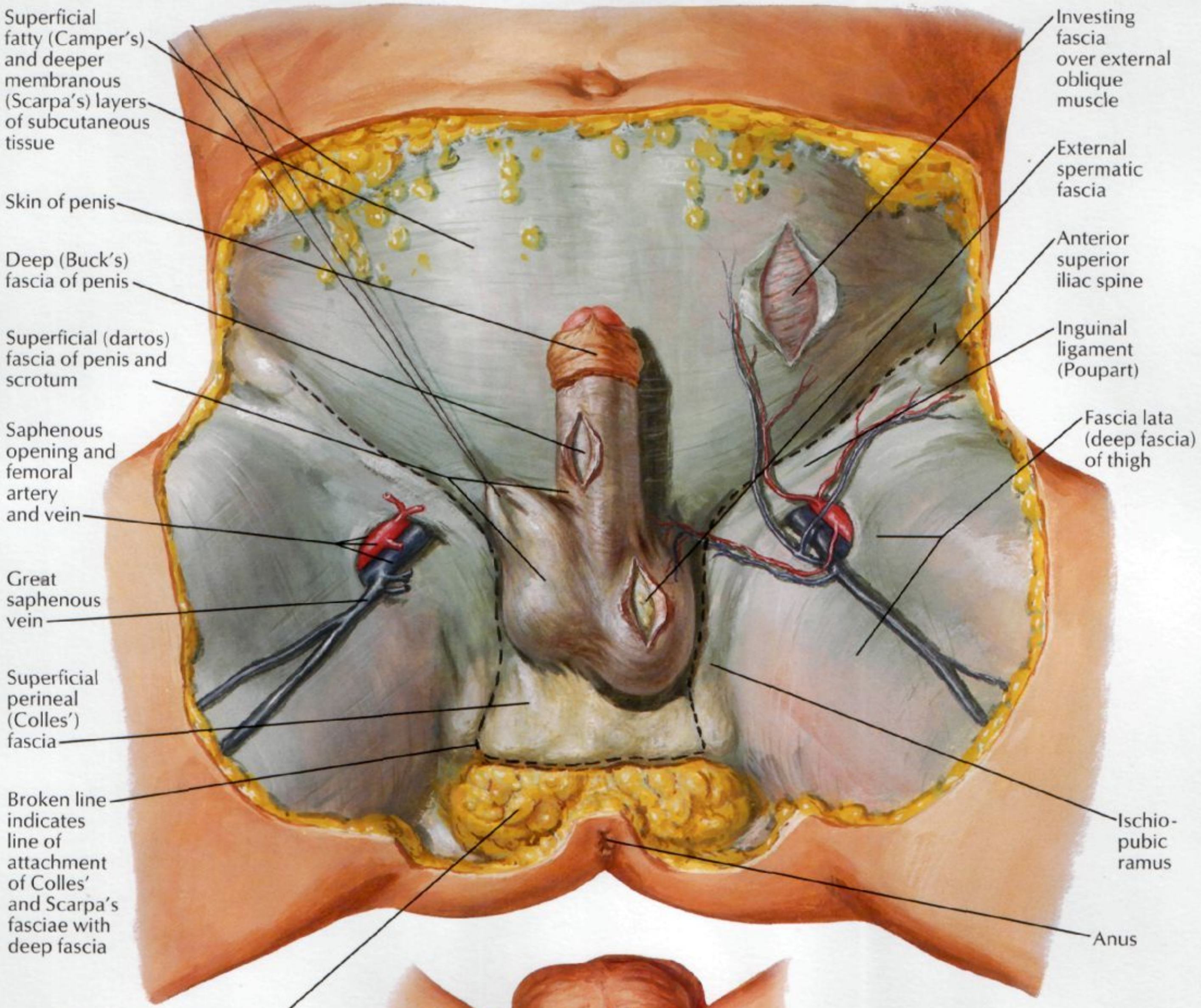
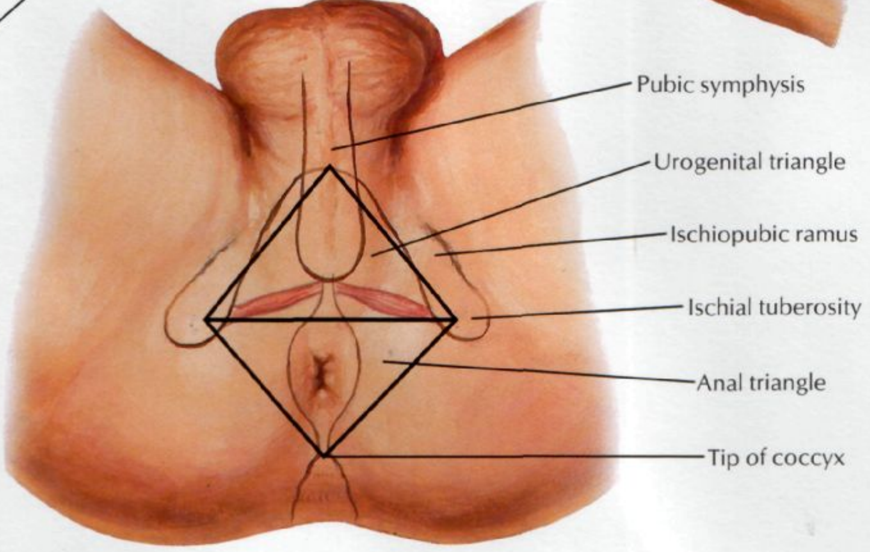
Schematic reconstruction

Perineum and External Genitalia (Superficial Dissection)


Superficial fatty (Camper's) and deeper membranous (Scarpa's) layers of subcutaneous tissue
Skin of penis
Deep (Buck's) fascia of penis
Superficial (dartos) fascia of penis and scrotum
Saphenous opening and femoral artery and vein
Great saphenous vein
Superficial perineal (Colles') fascia
Broken line indicates line of attachment of Colles' and Scarpa's fasciae with deep fascia
Investing fascia over external oblique muscle
External spermatic fascia
Anterior superior iliac spine
Inguinal ligament (Poupart)
Fascia lata (deep fascia) of thigh
Ischio-pubic ramus
Anus

Fat body in ischioanal fossa

Regions (triangles) of perineum: surface topography



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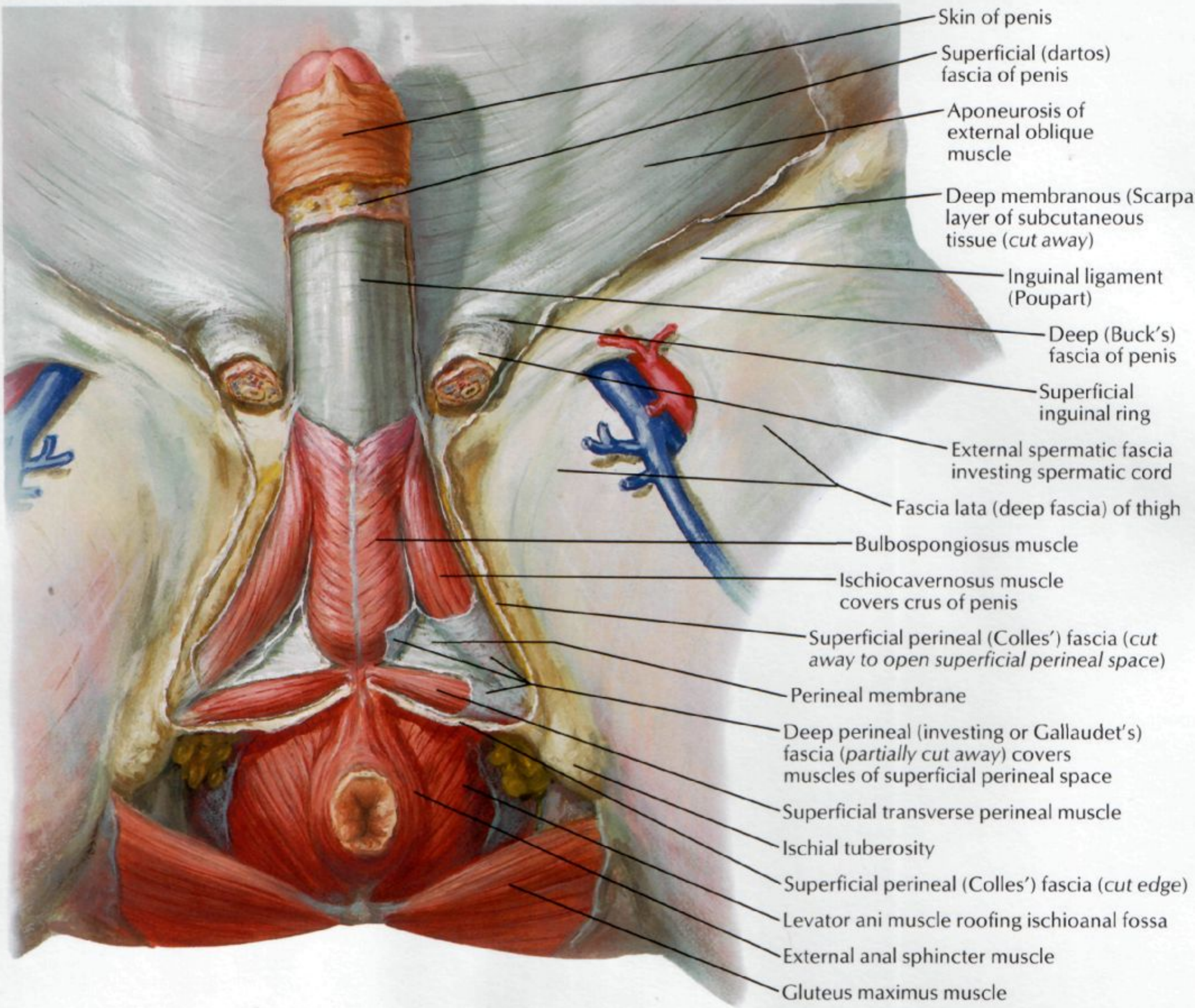
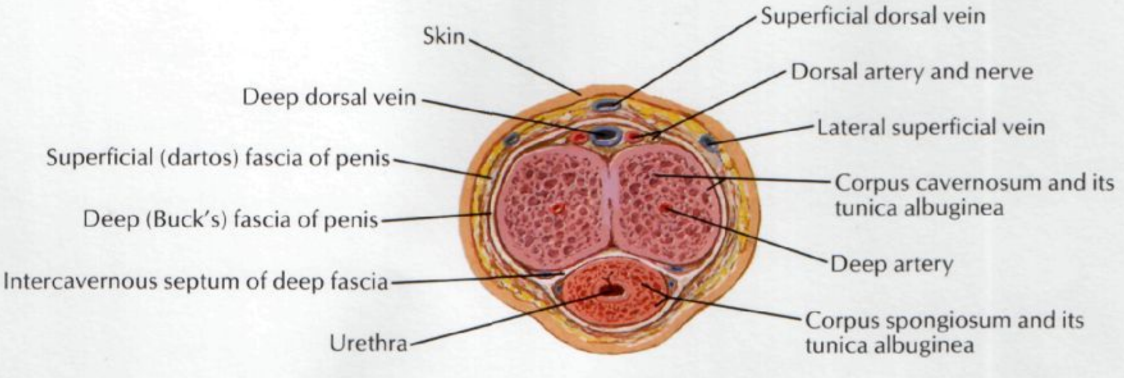
Perineum and External Genitalia (Deeper Dissection)

SEE ALSO PLATES 383, 385, 388–391, 396


Skin of penis
Superficial (dartos) fascia of penis
Aponeurosis of external oblique muscle
Deep membranous (Scarpa's) layer of subcutaneous tissue (*cut away*)
Inguinal ligament (Poupart)
Deep (Buck's) fascia of penis
Superficial inguinal ring
External spermatic fascia investing spermatic cord
Fascia lata (deep fascia) of thigh
Bulbospongiosus muscle
Ischiocavernosus muscle covers crus of penis
Superficial perineal (Colles') fascia (*cut away to open superficial perineal space*)
Perineal membrane
Deep perineal (investing or Gallaudet's) fascia (*partially cut away*) covers muscles of superficial perineal space
Superficial transverse perineal muscle
Ischial tuberosity
Superficial perineal (Colles') fascia (*cut edge*)
Levator ani muscle roofing ischioanal fossa
External anal sphincter muscle
Gluteus maximus muscle


Skin
Superficial dorsal vein
Dorsal artery and nerve
Deep dorsal vein
Lateral superficial vein
Superficial (dartos) fascia of penis
Corpus cavernosum and its tunica albuginea
Deep (Buck's) fascia of penis
Deep artery
Intercavernous septum of deep fascia
Corpus spongiosum and its tunica albuginea
Urethra

Section through body of penis

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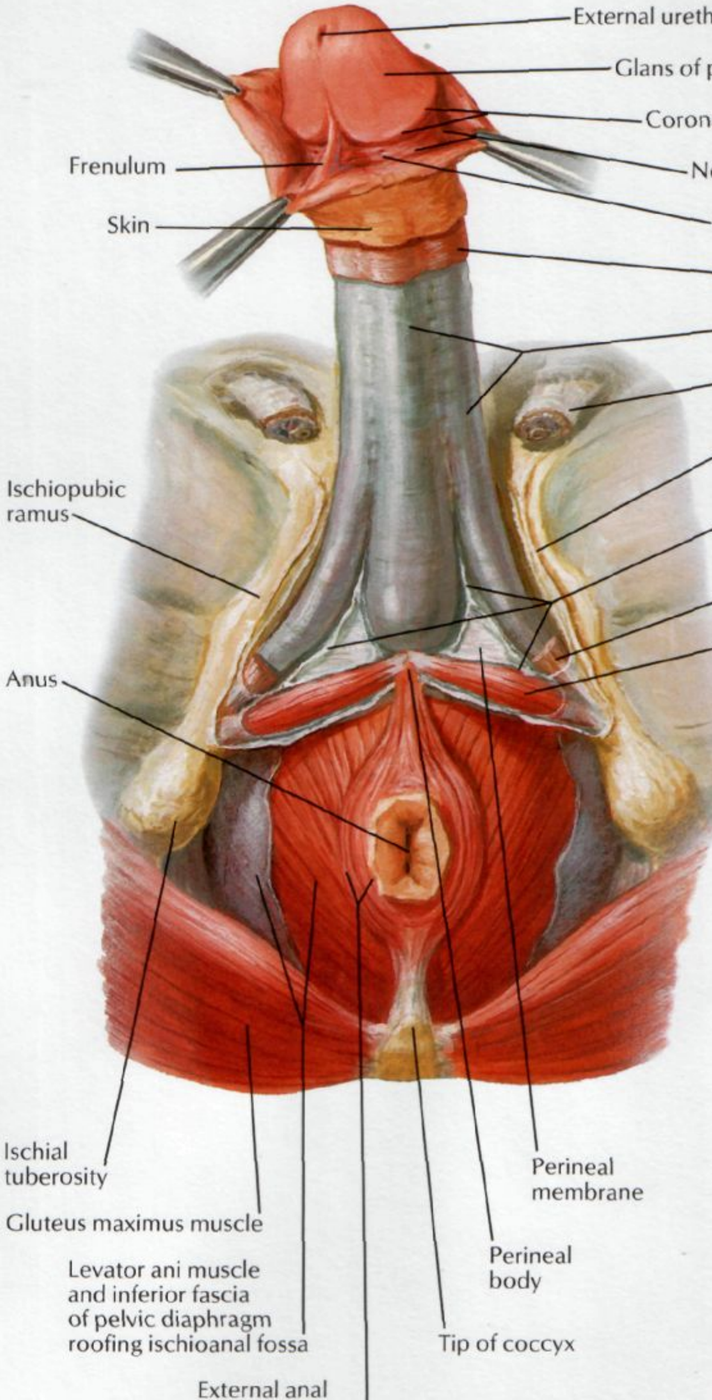
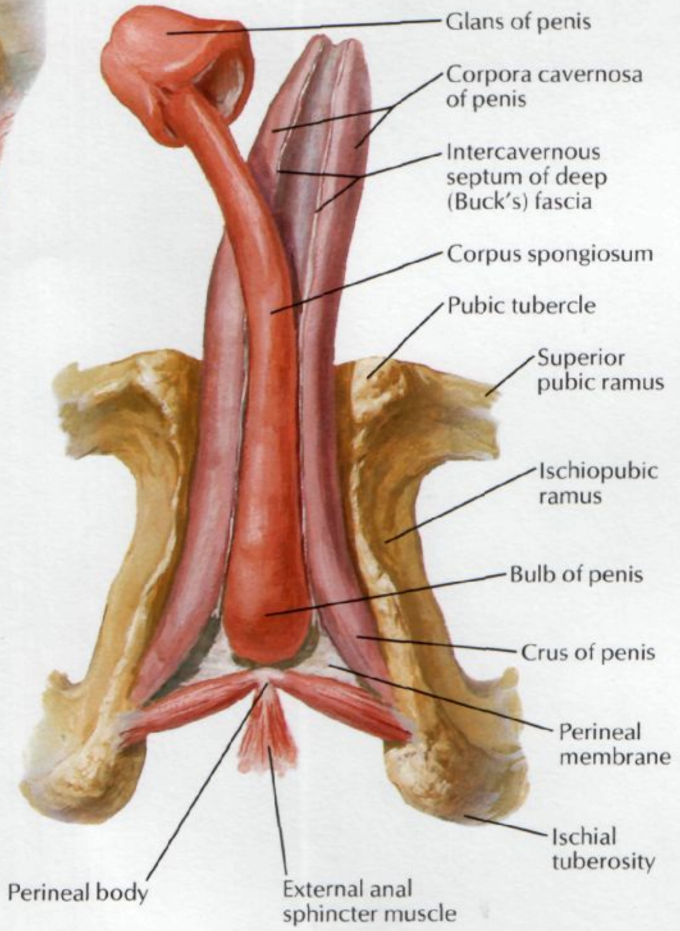
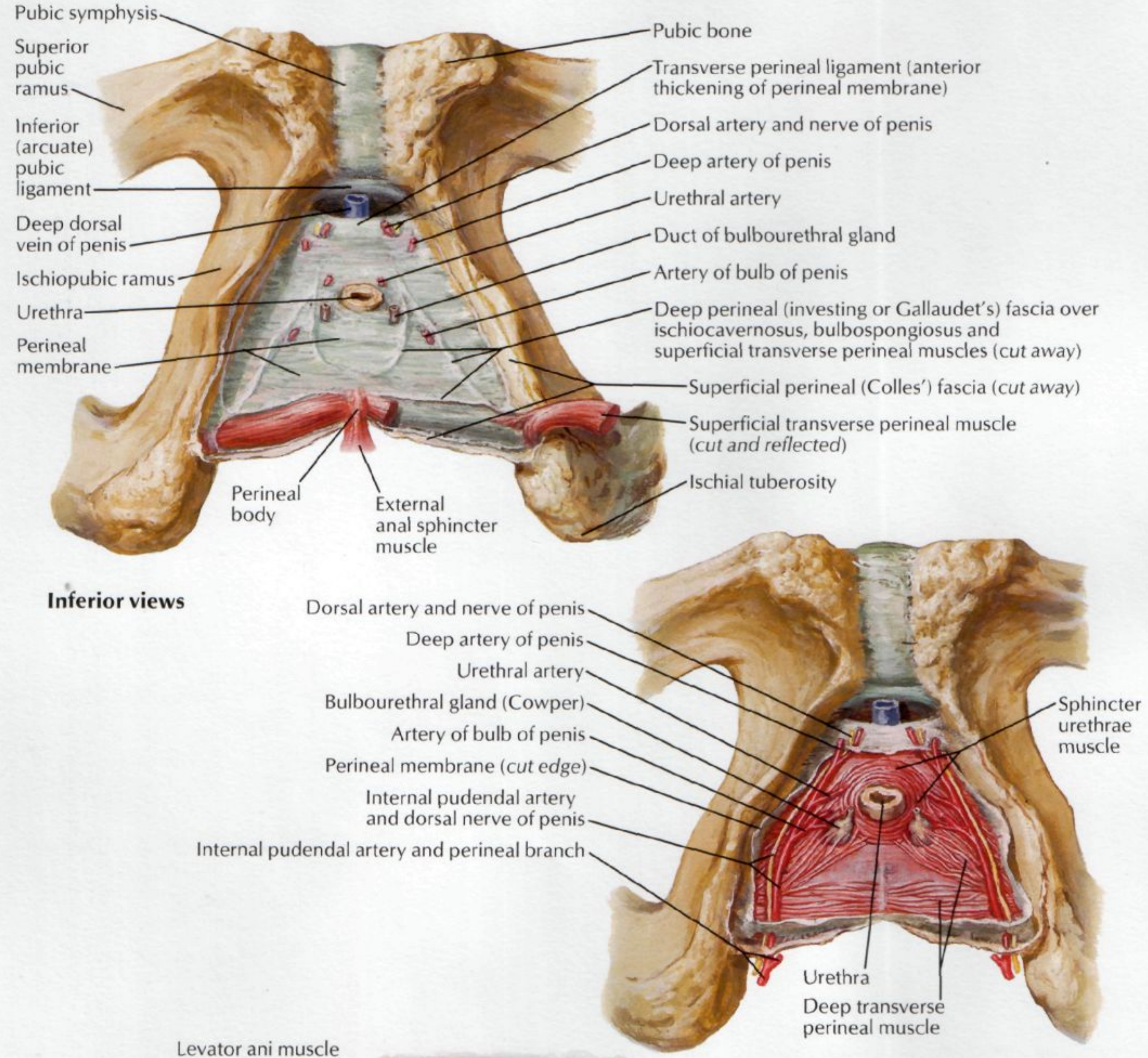
Penis

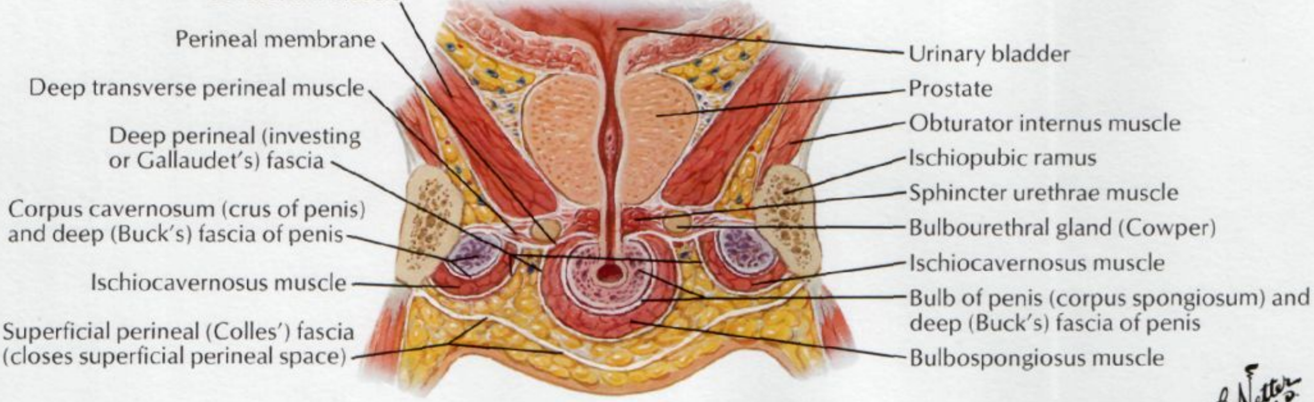

External urethral orifice (meatus)
Glans of penis
Corona of glans
Frenulum
Neck of glans
Skin
Opening of preputial (Tyson's) gland
Superficial (dartos) fascia of penis
Deep (Buck's) fascia of penis
External spermatic fascia investing spermatic cord (*cut*)
Superficial perineal (Colles') fascia (*cut away to open superficial perineal space*)
Ischiopubic ramus
Deep perineal (investing or Gallaudet's) fascia (*cut away*) over muscles of superficial perineal space
Ischiocavernosus muscle (*cut away*)
Superficial transverse perineal muscle
Anus
Ischial tuberosity
Perineal membrane
Gluteus maximus muscle
Perineal body
Levator ani muscle and inferior fascia of pelvic diaphragm roofing ischioanal fossa
Tip of coccyx
External anal sphincter muscle


Glans of penis
Corpora cavernosa of penis
Intercavernous septum of deep (Buck's) fascia
Corpus spongiosum
Pubic tubercle
Superior pubic ramus
Ischiopubic ramus
Bulb of penis
Crus of penis
Perineal membrane
Ischial tuberosity
Perineal body
External anal sphincter muscle

Perineal Spaces


Pubic symphysis
Superior pubic ramus
Inferior (arcuate) pubic ligament
Deep dorsal vein of penis
Ischiopubic ramus
Urethra
Perineal membrane
Pubic bone
Transverse perineal ligament (anterior thickening of perineal membrane)
Dorsal artery and nerve of penis
Deep artery of penis
Urethral artery
Duct of bulbourethral gland
Artery of bulb of penis
Deep perineal (investing or Gallaudet's) fascia over ischiocavernosus, bulbospongiosus and superficial transverse perineal muscles (*cut away*)
Superficial perineal (Colles') fascia (*cut away*)
Superficial transverse perineal muscle (*cut and reflected*)
Ischial tuberosity
Perineal body
External anal sphincter muscle
Dorsal artery and nerve of penis
Deep artery of penis
Urethral artery
Bulbourethral gland (Cowper)
Artery of bulb of penis
Perineal membrane (*cut edge*)
Internal pudendal artery and dorsal nerve of penis
Internal pudendal artery and perineal branch
Sphincter urethrae muscle
Urethra
Deep transverse perineal muscle

Inferior views


Levator ani muscle
Perineal membrane
Deep transverse perineal muscle
Deep perineal (investing or Gallaudet's) fascia
Corpus cavernosum (crus of penis) and deep (Buck's) fascia of penis
Ischiocavernosus muscle
Superficial perineal (Colles') fascia (closes superficial perineal space)
Urinary bladder
Prostate
Obturator internus muscle
Ischiopubic ramus
Sphincter urethrae muscle
Bulbourethral gland (Cowper)
Ischiocavernosus muscle
Bulb of penis (corpus spongiosum) and deep (Buck's) fascia of penis
Bulbospongiosus muscle

Frontal section, anterior view of perineum: schema

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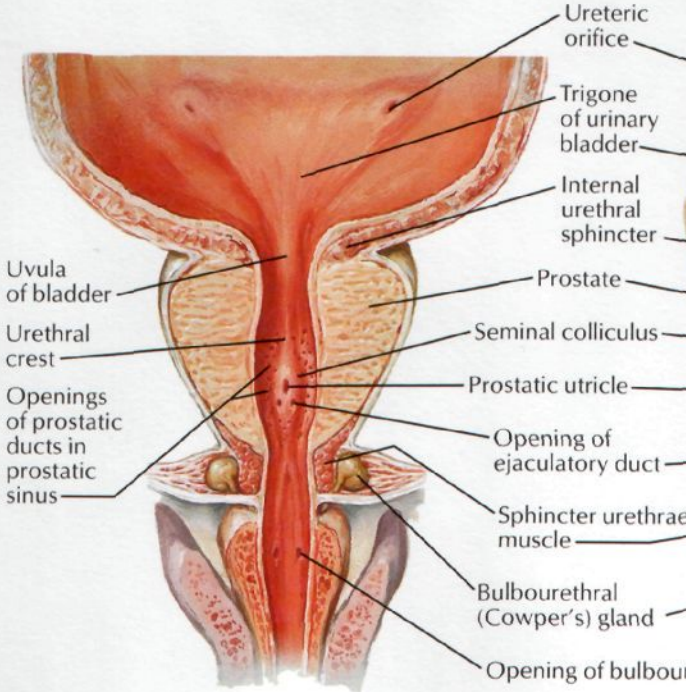
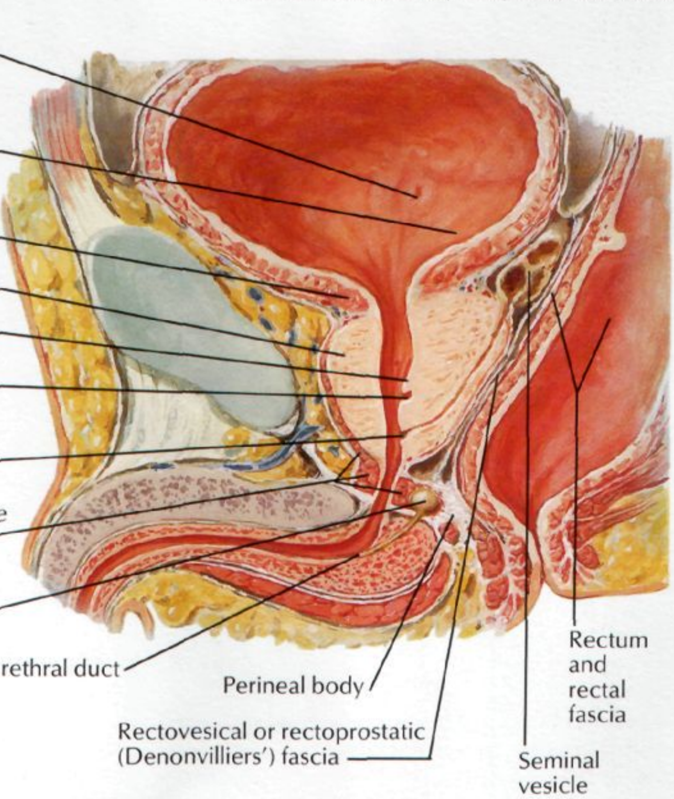
Prostate and Seminal Vesicles

SEE ALSO PLATES 348, 350, 353, 383, 390



Ureteric orifice
Trigone of urinary bladder
Internal urethral sphincter
Uvula of bladder
Prostate
Urethral crest
Seminal colliculus
Prostatic utricle
Openings of prostatic ducts in prostatic sinus
Opening of ejaculatory duct
Sphincter urethrae muscle
Bulbourethral (Cowper's) gland
Opening of bulbourethral duct

Frontal section, anterior view of bulbous portion of spongy urethra schematically extended



Sagittal section

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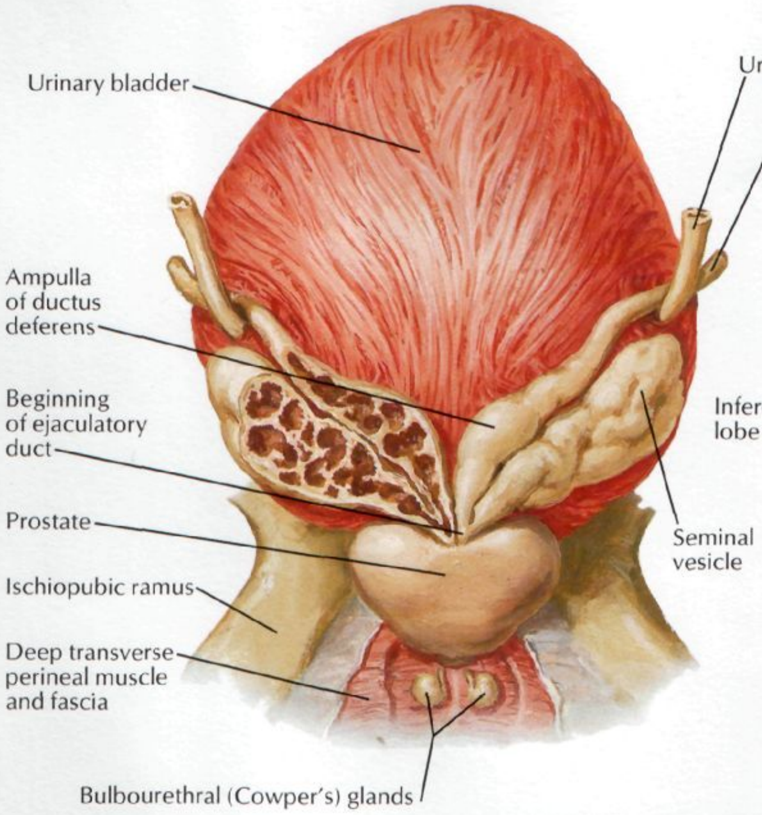
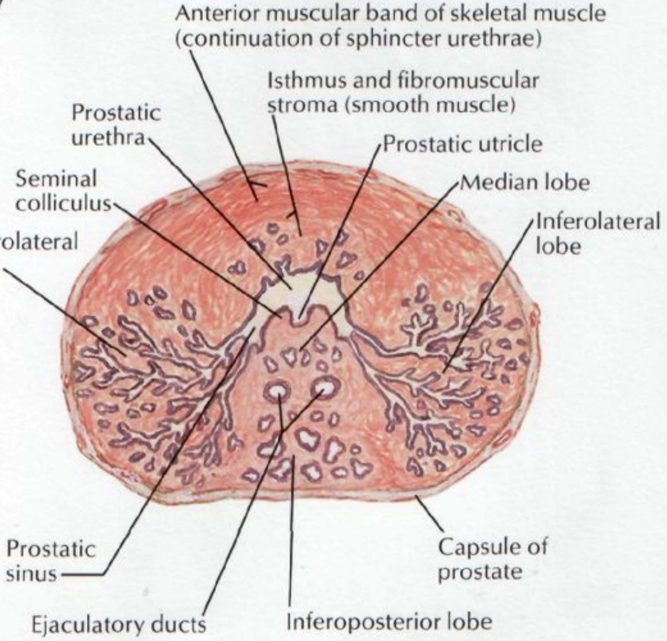


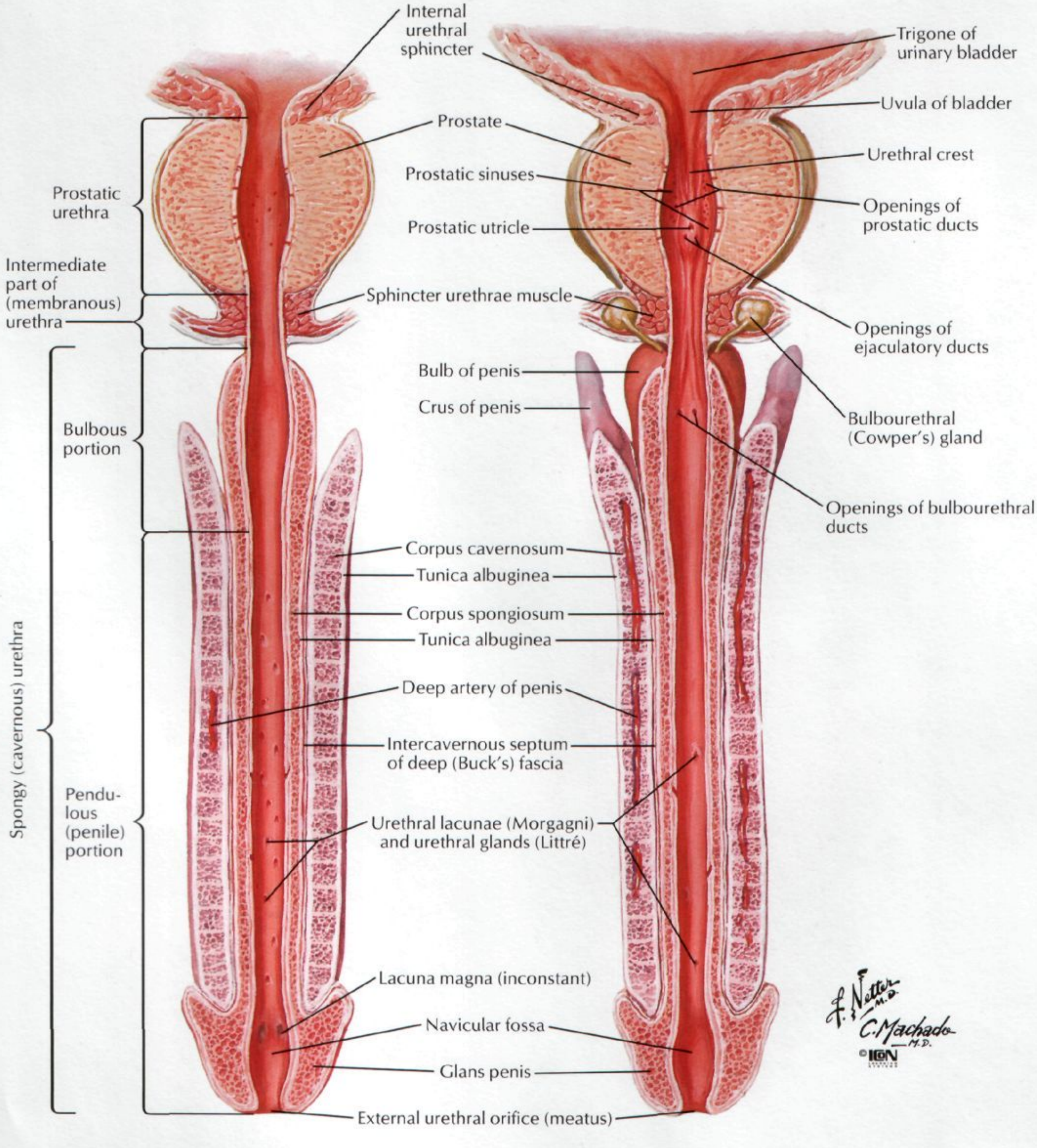
Urinary bladder
Ureter
Ductus deferens
Ampulla of ductus deferens
Beginning of ejaculatory duct
Prostate
Ischiopubic ramus
Deep transverse perineal muscle and fascia
Seminal vesicle
Bulbourethral (Cowper's) glands

Posterior view



Cross section through prostate

Urethra


Internal urethral sphincter
Trigone of urinary bladder
Uvula of bladder
Prostate
Urethral crest
Prostatic sinuses
Openings of prostatic ducts
Prostatic urethra
Prostatic utricle
Intermediate part of (membranous) urethra
Sphincter urethrae muscle
Openings of ejaculatory ducts
Bulb of penis
Crus of penis
Bulbous portion
Bulbourethral (Cowper's) gland
Openings of bulbourethral ducts
Corpus cavernosum
Tunica albuginea
Corpus spongiosum
Tunica albuginea
Spongy (cavernous) urethra
Deep artery of penis
Intercavernous septum of deep (Buck's) fascia
Pendulous (penile) portion
Urethral lacunae (Morgagni) and urethral glands (Littré)
Lacuna magna (inconstant)
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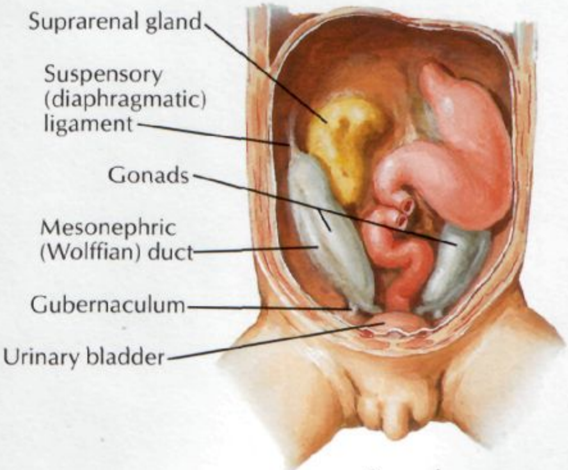
Navicular fossa
Glans penis
External urethral orifice (meatus)

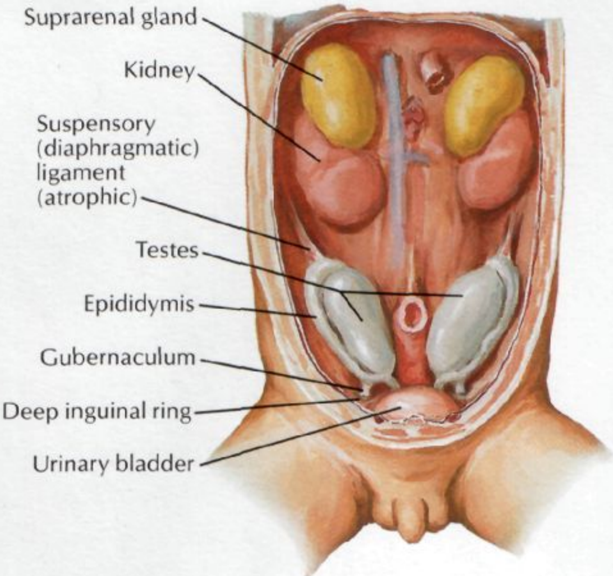
Roof of urethra

Floor of urethra

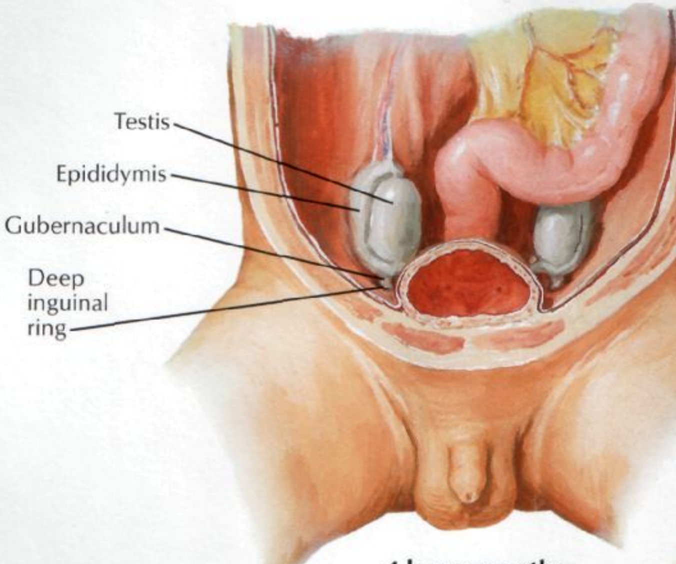
Descent of Testis


Suprarenal gland
Suspensory (diaphragmatic) ligament
Gonads
Mesonephric (Wolffian) duct
Gubernaculum
Urinary bladder

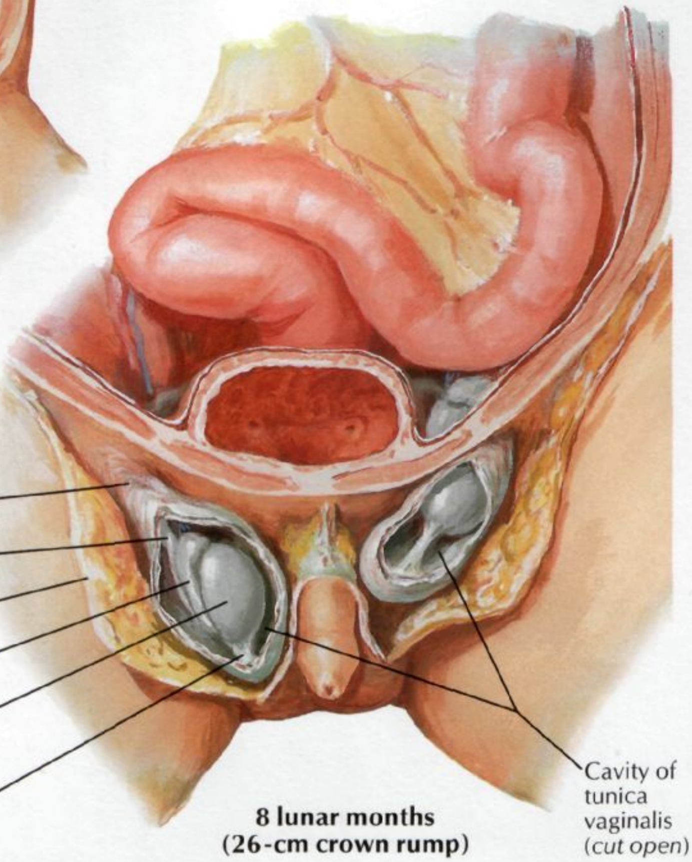
8 weeks
(22.5-mm crown rump)



11 weeks
(43-mm crown rump)



4 lunar months
(107-mm crown rump)


Superficial inguinal ring
Ductus deferens
Scrotum (*cut open*)
Epididymis
Testis
Gubernaculum
Cavity of tunica vaginalis (*cut open*)

8 lunar months
(26-cm crown rump)

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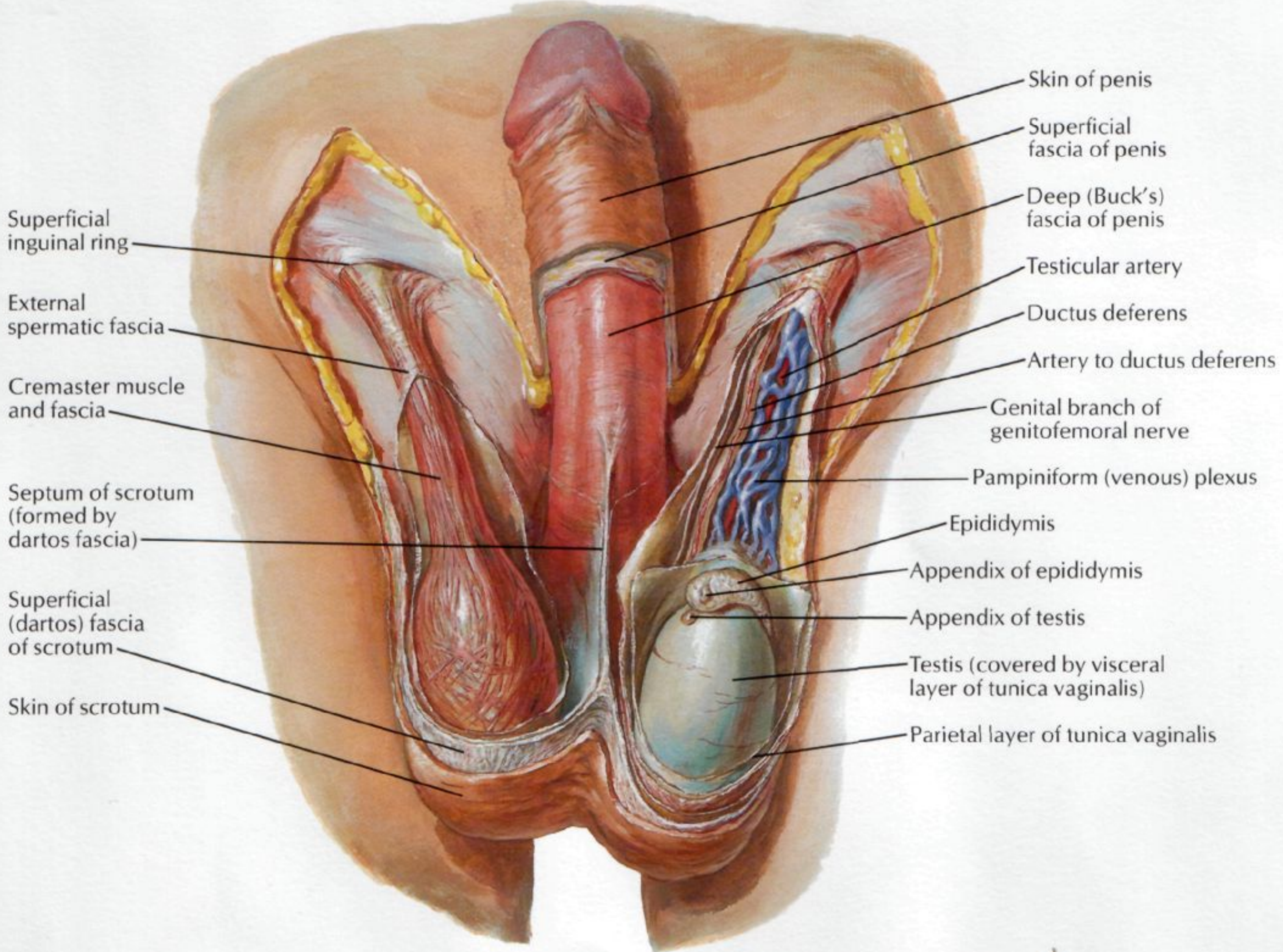
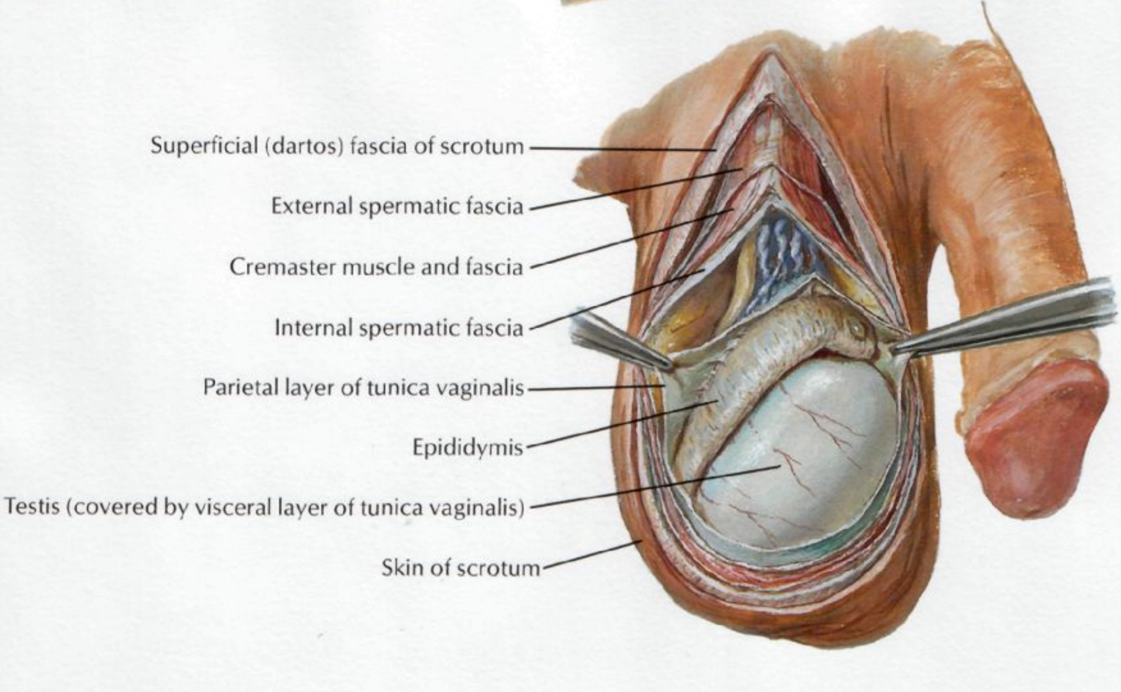
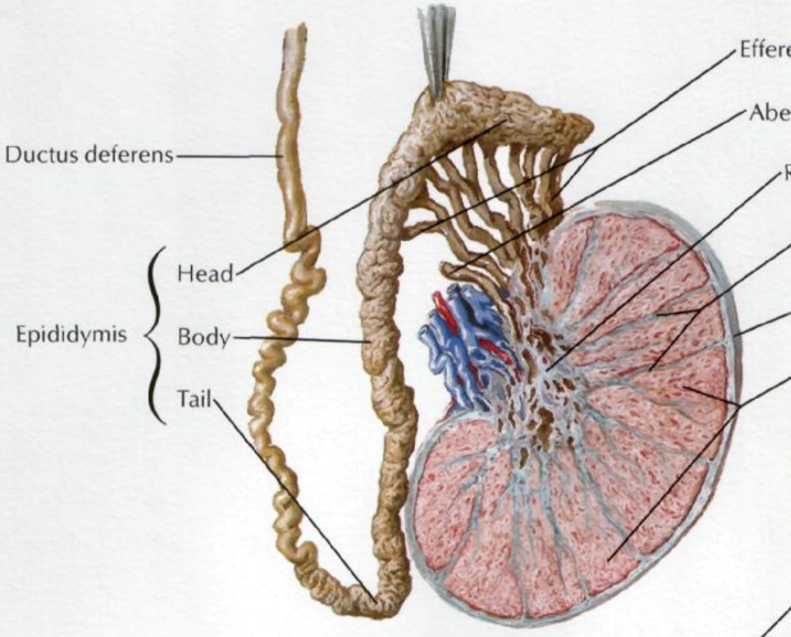
Scrotum and Contents

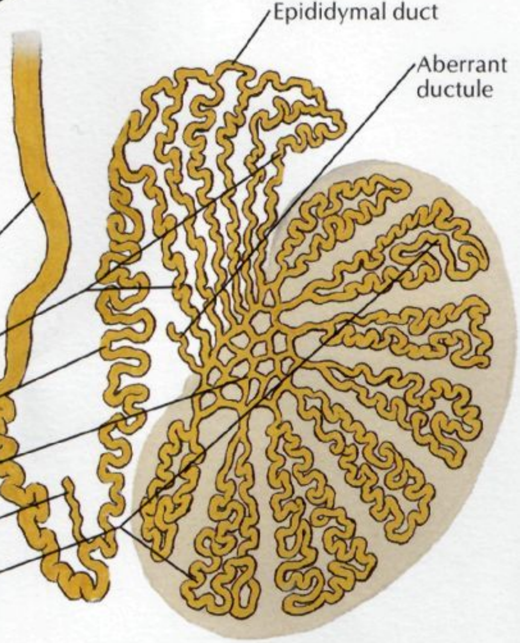

Skin of penis
Superficial fascia of penis
Deep (Buck's) fascia of penis
Testicular artery
Ductus deferens
Artery to ductus deferens
Genital branch of genitofemoral nerve
Pampiniform (venous) plexus
Epididymis
Appendix of epididymis
Appendix of testis
Testis (covered by visceral layer of tunica vaginalis)
Parietal layer of tunica vaginalis
Superficial inguinal ring
External spermatic fascia
Cremaster muscle and fascia
Septum of scrotum (formed by dartos fascia)
Superficial (dartos) fascia of scrotum
Skin of scrotum


Superficial (dartos) fascia of scrotum
External spermatic fascia
Cremaster muscle and fascia
Internal spermatic fascia
Parietal layer of tunica vaginalis
Epididymis
Testis (covered by visceral layer of tunica vaginalis)
Skin of scrotum

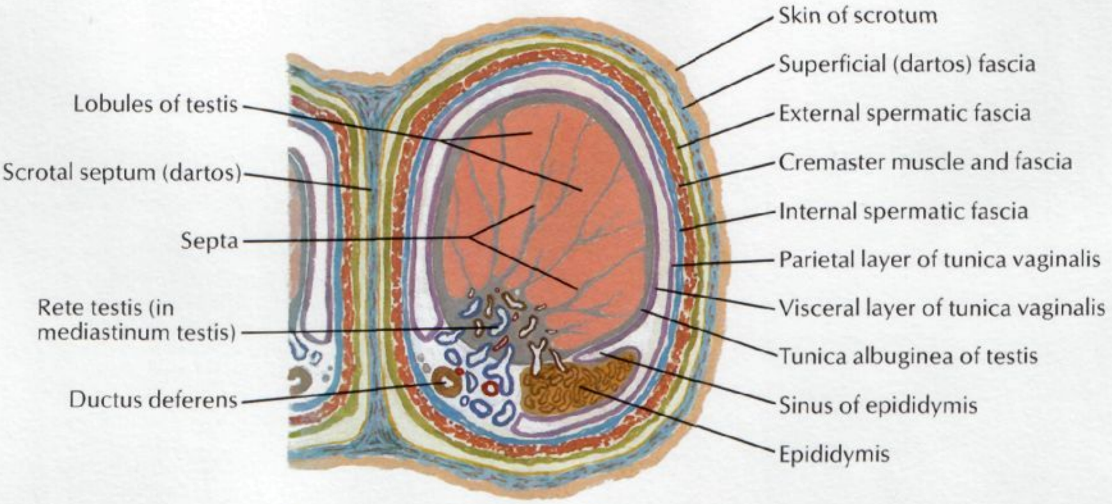
Testis, Epididymis and Ductus Deferens


Efferent ductules
Aberrant ductule (vestigial mesonephric tubule)
Ductus deferens
Rete testis (in mediastinum testis)
Septa
Head
Epididymis
Body
Tail
Tunica albuginea
Lobules

Frontal section

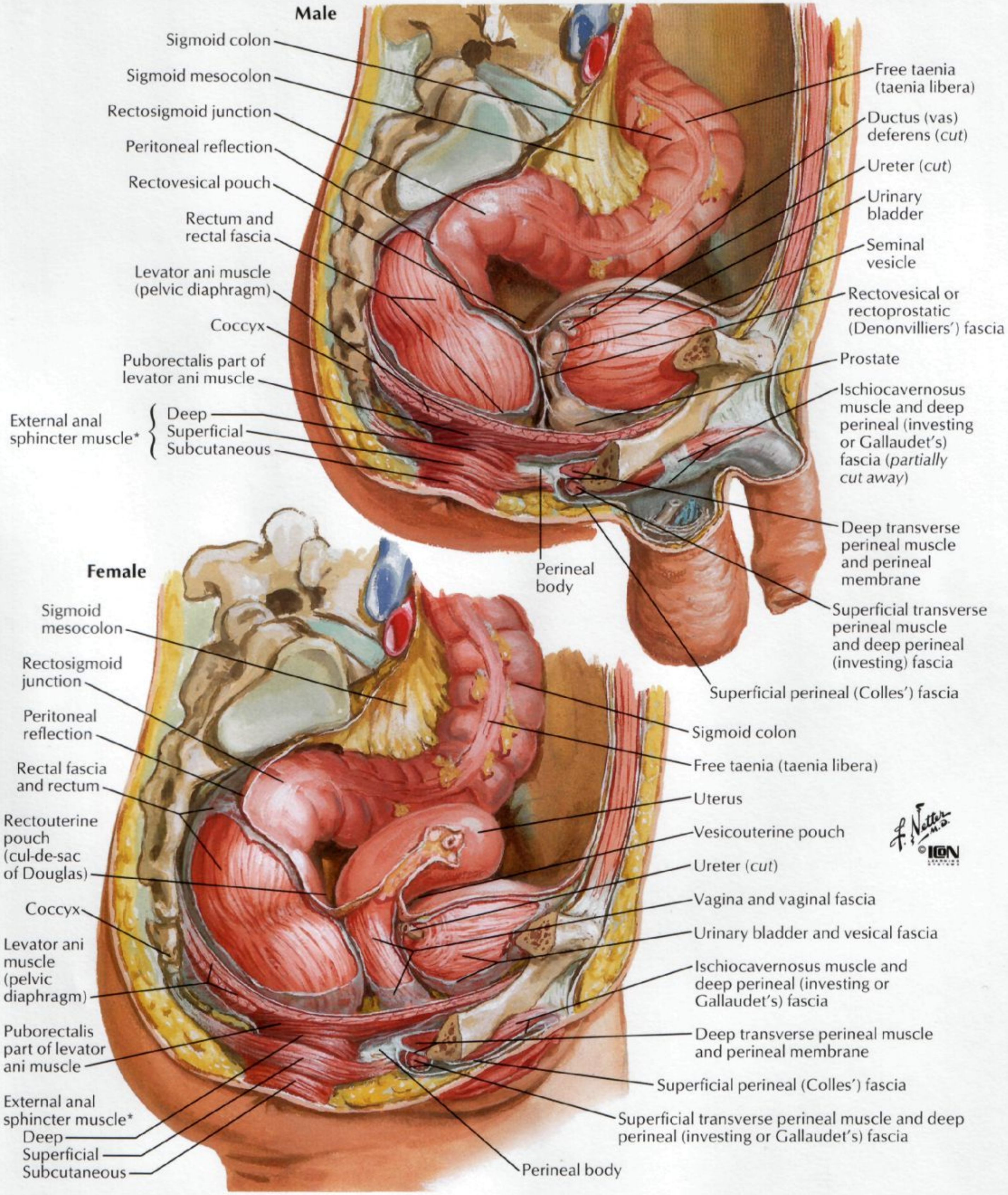


Schema


Skin of scrotum
Superficial (dartos) fascia
Lobules of testis
External spermatic fascia
Cremaster muscle and fascia
Scrotal septum (dartos)
Internal spermatic fascia
Septa
Parietal layer of tunica vaginalis
Visceral layer of tunica vaginalis
Rete testis (in mediastinum testis)
Tunica albuginea of testis
Ductus deferens
Sinus of epididymis
Epididymis

Cross section through scrotum and testis

Rectum In Situ: Female and Male


Male
Sigmoid colon
Sigmoid mesocolon
Rectosigmoid junction
Peritoneal reflection
Rectovesical pouch
Rectum and rectal fascia
Levator ani muscle (pelvic diaphragm)
Coccyx
Puborectalis part of levator ani muscle
External anal sphincter muscle*
Deep
Superficial
Subcutaneous
Perineal body
Free taenia (taenia libera)
Ductus (vas) deferens (*cut*)
Ureter (*cut*)
Urinary bladder
Seminal vesicle
Rectovesical or rectoprostatic (Denonvilliers') fascia
Prostate
Ischiocavernosus muscle and deep perineal (investing or Gallaudet's) fascia (*partially cut away*)
Deep transverse perineal muscle and perineal membrane
Superficial transverse perineal muscle and deep perineal (investing) fascia
Superficial perineal (Colles') fascia
Female
Sigmoid mesocolon
Rectosigmoid junction
Peritoneal reflection
Rectal fascia and rectum
Rectouterine pouch (cul-de-sac of Douglas)
Coccyx
Levator ani muscle (pelvic diaphragm)
Puborectalis part of levator ani muscle
External anal sphincter muscle*
Deep
Superficial
Subcutaneous
Sigmoid colon
Free taenia (taenia libera)
Uterus
Vesicouterine pouch
Ureter (*cut*)
Vagina and vaginal fascia
Urinary bladder and vesical fascia
Ischiocavernosus muscle and deep perineal (investing or Gallaudet's) fascia
Deep transverse perineal muscle and perineal membrane
Superficial perineal (Colles') fascia
Superficial transverse perineal muscle and deep perineal (investing or Gallaudet's) fascia
Perineal body
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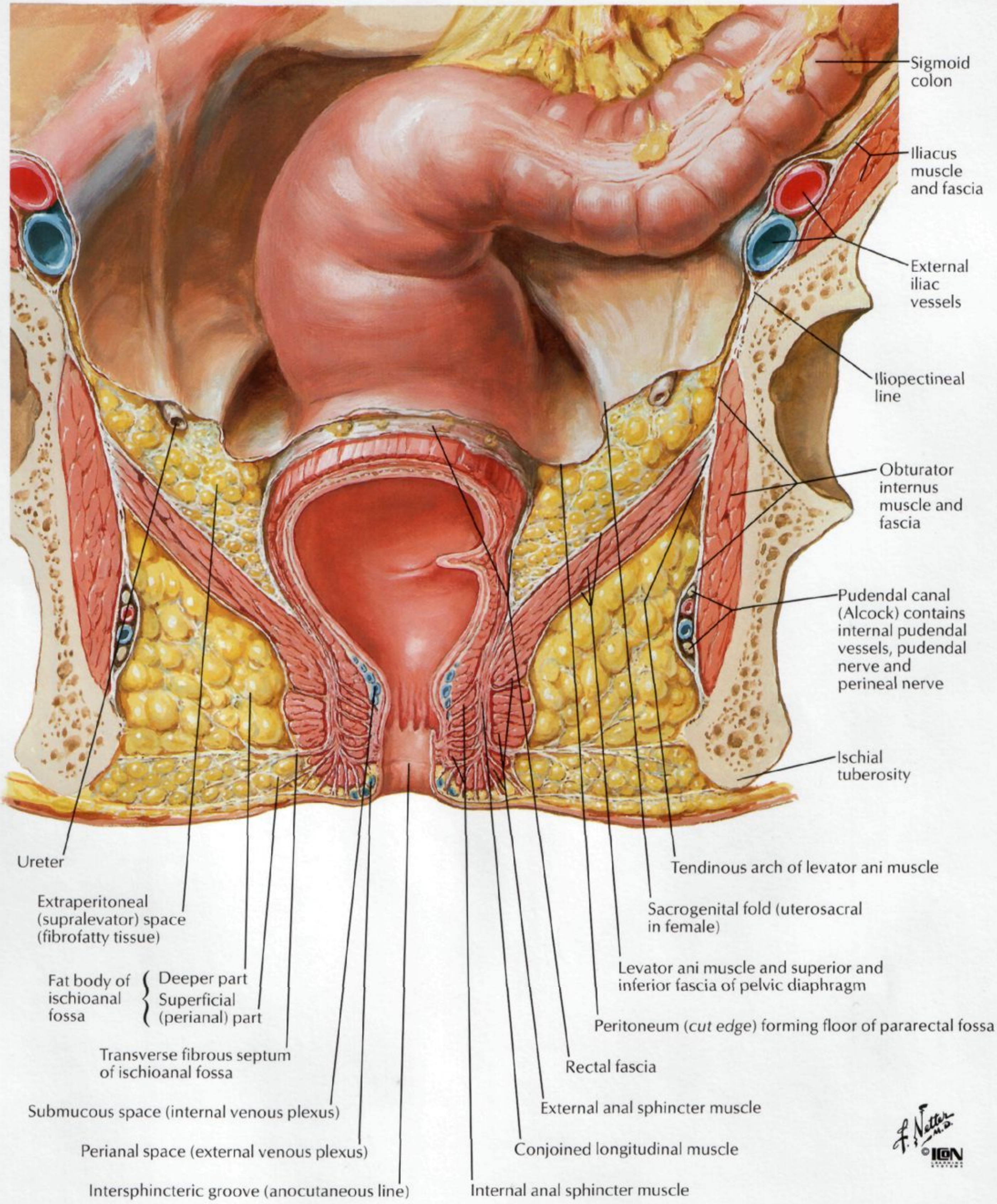
*Parts variable and often indistinct

Ischioanal Fossae

SEE ALSO PLATES 306, 390–393



Sigmoid colon
Iliacus muscle and fascia
External iliac vessels
Iliopectineal line
Obturator internus muscle and fascia
Pudendal canal (Alcock) contains internal pudendal vessels, pudendal nerve and perineal nerve
Ischial tuberosity
Ureter
Tendinous arch of levator ani muscle
Extraperitoneal (supralevator) space (fibrofatty tissue)
Sacrogenital fold (uterosacral in female)
Fat body of ischioanal fossa { Deeper part
Superficial (perianal) part
Levator ani muscle and superior and inferior fascia of pelvic diaphragm
Peritoneum (*cut edge*) forming floor of pararectal fossa
Transverse fibrous septum of ischioanal fossa
Rectal fascia
Submucous space (internal venous plexus)
External anal sphincter muscle
Perianal space (external venous plexus)
Conjoined longitudinal muscle
Intersphincteric groove (anocutaneous line)
Internal anal sphincter muscle
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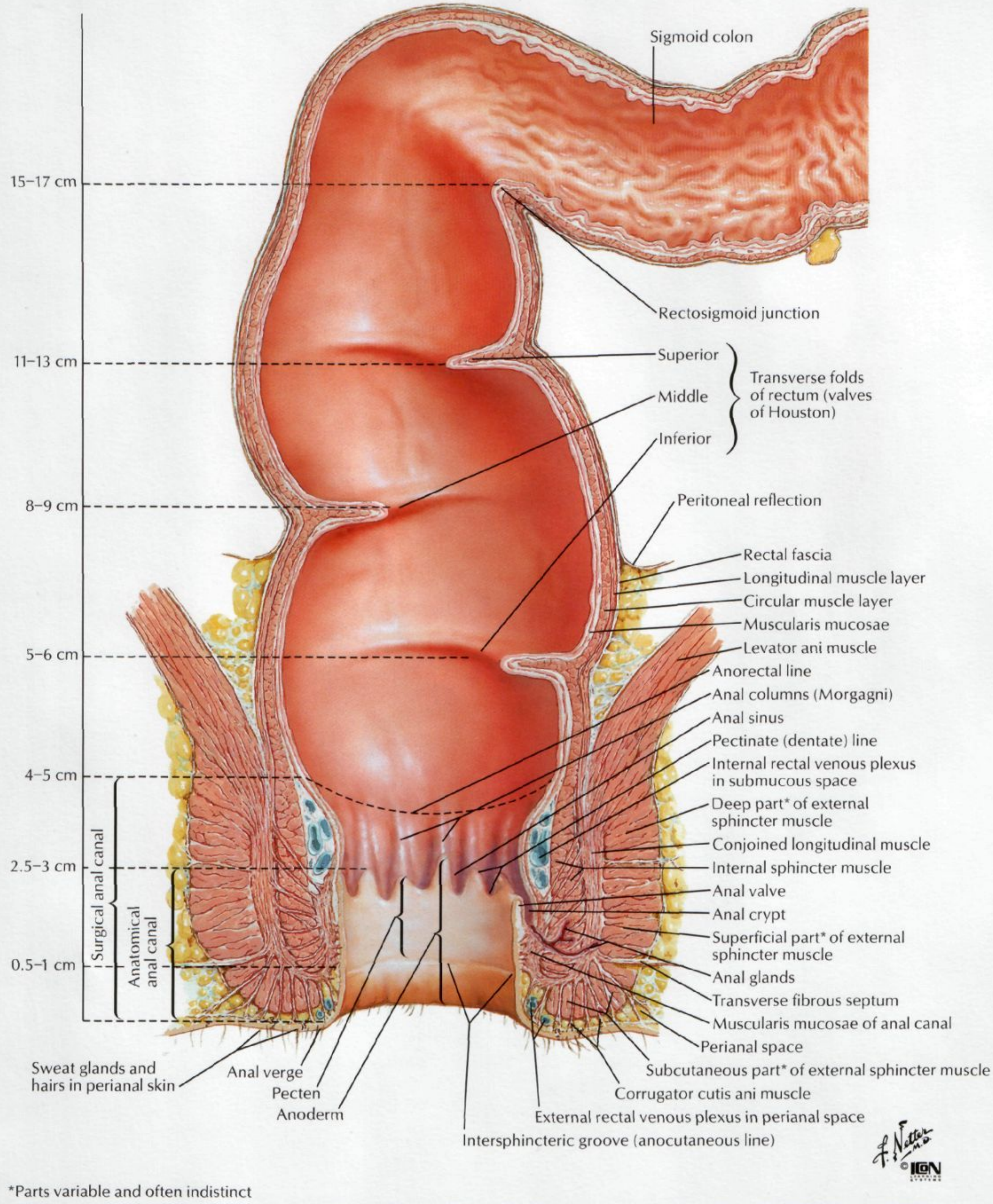
Rectum and Anal Canal



Sigmoid colon
15–17 cm
Rectosigmoid junction
11–13 cm
Superior
Middle
Inferior
Transverse folds of rectum (valves of Houston)
8–9 cm
Peritoneal reflection
Rectal fascia
Longitudinal muscle layer
Circular muscle layer
Muscularis mucosae
5–6 cm
Levator ani muscle
Anorectal line
Anal columns (Morgagni)
Anal sinus
Pectinate (dentate) line
4–5 cm
Internal rectal venous plexus in submucous space
Deep part* of external sphincter muscle
Conjoined longitudinal muscle
2.5–3 cm
Internal sphincter muscle
Anal valve
Anal crypt
Surgical anal canal
Anatomical anal canal
Superficial part* of external sphincter muscle
0.5–1 cm
Anal glands
Transverse fibrous septum
Muscularis mucosae of anal canal
Perianal space
Sweat glands and hairs in perianal skin
Anal verge
Pecten
Anoderm
Subcutaneous part* of external sphincter muscle
Corrugator cutis ani muscle
External rectal venous plexus in perianal space
Intersphincteric groove (anocutaneous line)
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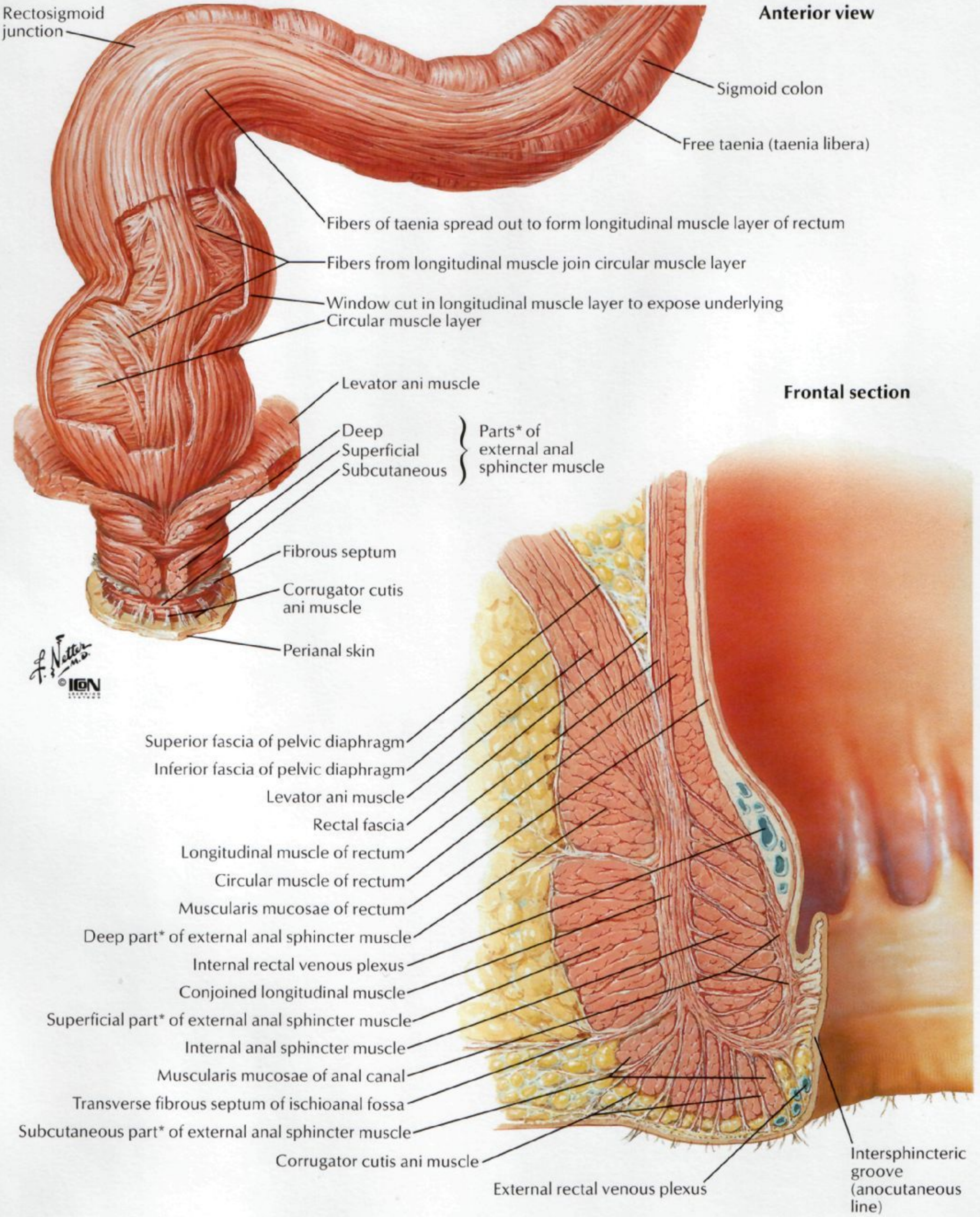
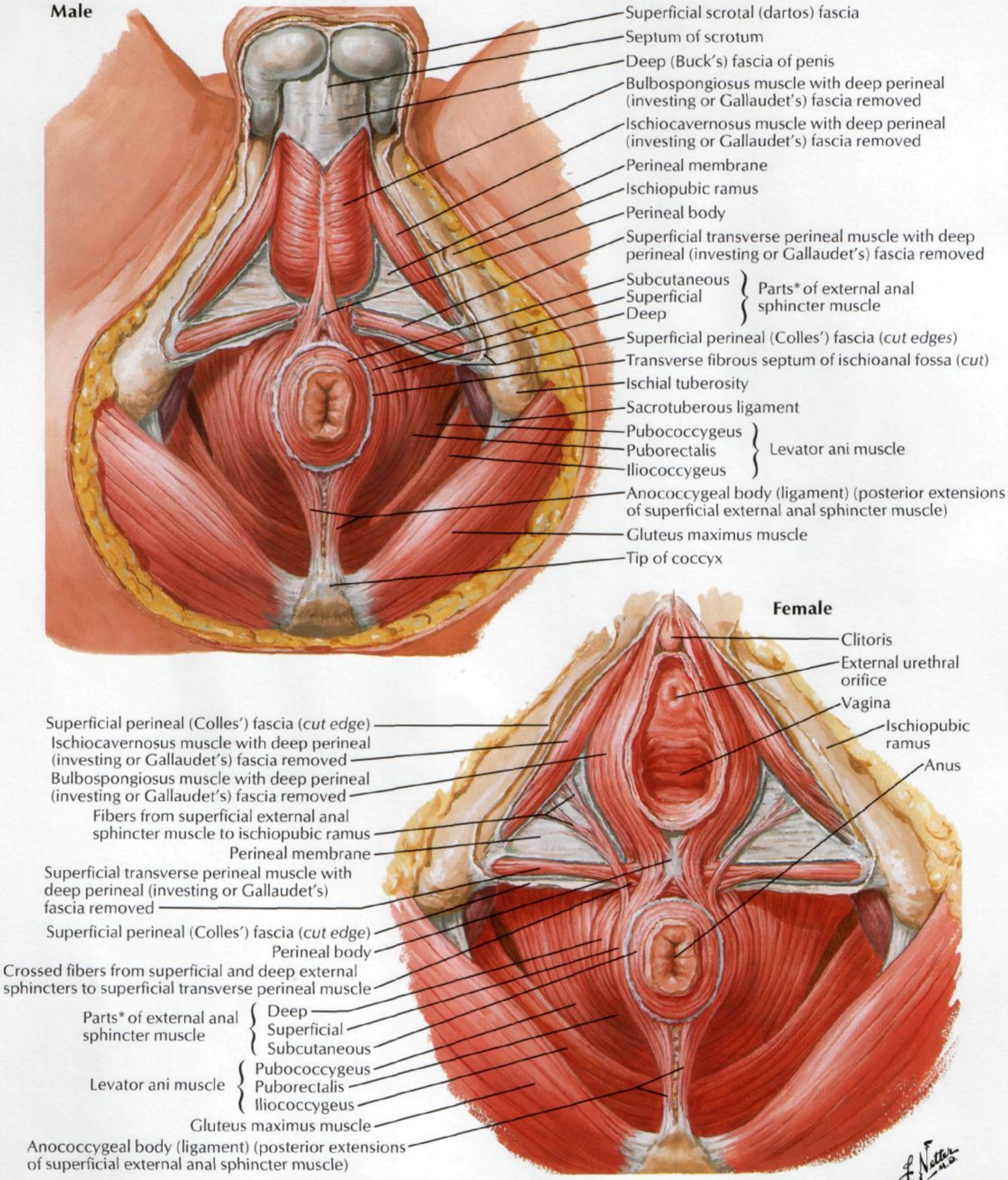
*Parts variable and often indistinct

Anorectal Musculature


Anterior view
Rectosigmoid junction
Sigmoid colon
Free taenia (taenia libera)
Fibers of taenia spread out to form longitudinal muscle layer of rectum
Fibers from longitudinal muscle join circular muscle layer
Window cut in longitudinal muscle layer to expose underlying
Circular muscle layer
Levator ani muscle
Deep
Superficial
Subcutaneous
Parts* of external anal sphincter muscle
Fibrous septum
Corrugator cutis ani muscle
Perianal skin
Frontal section
Superior fascia of pelvic diaphragm
Inferior fascia of pelvic diaphragm
Levator ani muscle
Rectal fascia
Longitudinal muscle of rectum
Circular muscle of rectum
Muscularis mucosae of rectum
Deep part* of external anal sphincter muscle
Internal rectal venous plexus
Conjoined longitudinal muscle
Superficial part* of external anal sphincter muscle
Internal anal sphincter muscle
Muscularis mucosae of anal canal
Transverse fibrous septum of ischioanal fossa
Subcutaneous part* of external anal sphincter muscle
Corrugator cutis ani muscle
External rectal venous plexus
Intersphincteric groove (anocutaneous line)

*Parts variable and often indistinct

External Anal Sphincter Muscle: Perineal Views


Male
Superficial scrotal (dartos) fascia
Septum of scrotum
Deep (Buck's) fascia of penis
Bulbospongiosus muscle with deep perineal (investing or Gallaudet's) fascia removed
Ischiocavernosus muscle with deep perineal (investing or Gallaudet's) fascia removed
Perineal membrane
Ischiopubic ramus
Perineal body
Superficial transverse perineal muscle with deep perineal (investing or Gallaudet's) fascia removed
Subcutaneous
Superficial
Deep
Parts* of external anal sphincter muscle
Superficial perineal (Colles') fascia (*cut edges*)
Transverse fibrous septum of ischioanal fossa (*cut*)
Ischial tuberosity
Sacrotuberous ligament
Pubococcygeus
Puborectalis
Iliococcygeus
Levator ani muscle
Anococcygeal body (ligament) (posterior extensions of superficial external anal sphincter muscle)
Gluteus maximus muscle
Tip of coccyx
Female
Clitoris
External urethral orifice
Vagina
Ischiopubic ramus
Anus
Superficial perineal (Colles') fascia (*cut edge*)
Ischiocavernosus muscle with deep perineal (investing or Gallaudet's) fascia removed
Bulbospongiosus muscle with deep perineal (investing or Gallaudet's) fascia removed
Fibers from superficial external anal sphincter muscle to ischiopubic ramus
Perineal membrane
Superficial transverse perineal muscle with deep perineal (investing or Gallaudet's) fascia removed
Superficial perineal (Colles') fascia (*cut edge*)
Perineal body
Crossed fibers from superficial and deep external sphincters to superficial transverse perineal muscle
Parts* of external anal sphincter muscle
Deep
Superficial
Subcutaneous
Levator ani muscle
Pubococcygeus
Puborectalis
Iliococcygeus
Gluteus maximus muscle
Anococcygeal body (ligament) (posterior extensions of superficial external anal sphincter muscle)
F. Netter M.D.
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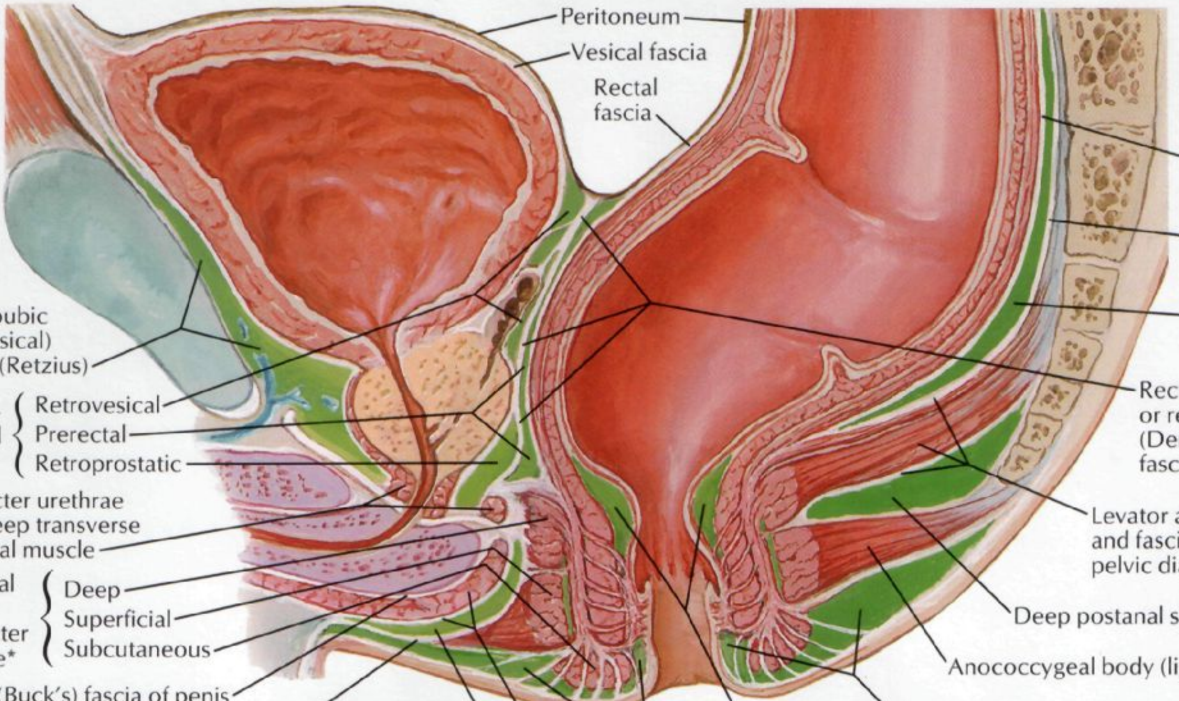
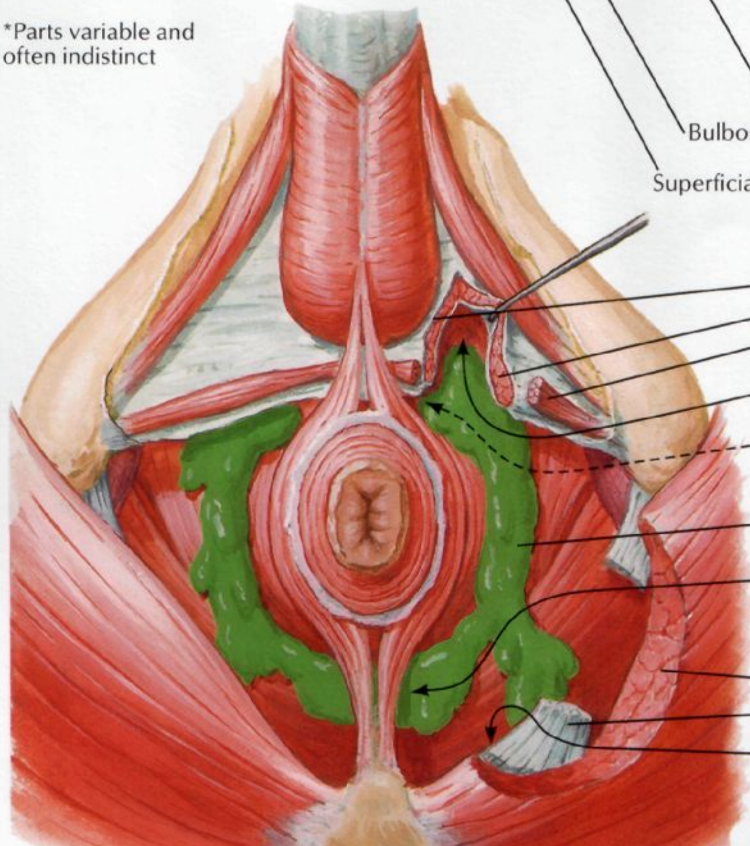
*Parts variable and often indistinct

Actual and Potential Perineopelvic Spaces

Sagittal section


Peritoneum
Vesical fascia
Rectal fascia
Rectal fascia
Presacral fascia
Presacral space
Rectovesical or rectoprostatic (Denonvilliers') fascia (septum)
Levator ani muscle and fascia of pelvic diaphragm
Deep postanal space
Anococcygeal body (ligament)
Superficial postanal space (part of perianal space)
Submucous space
Perianal space
Bulbospongiosus muscle and deep perineal (Gallaudet's) fascia
Superficial perineal compartment (space or pouch)
Retropubic (prevesical) space (Retzius)
Recto-vesical space
Retrovesical
Prerectal
Retroprostatic
Sphincter urethrae and deep transverse perineal muscle
External anal sphincter muscle*
Deep
Superficial
Subcutaneous
Deep (Buck's) fascia of penis
Superficial perineal (Colles') fascia

*Parts variable and often indistinct


Perineal membrane,
Deep transverse perineal muscle and
Superficial transverse perineal muscle (cut away) to expose
Anterior recess of ischioanal fossa
Preanal communication (inconstant) between right and left ischioanal fossae
Pus in ischioanal fossa
Posterior communication between right and left ischioanal fossae via deep postanal space deep to anococcygeal body (ligament)
Gluteus maximus muscle and
Sacrotuberous ligament (cut away) to expose
Posterior recess of ischioanal fossa

Perineal view

Spread of perineal abscess in perineal spaces

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C. Machado M.D.
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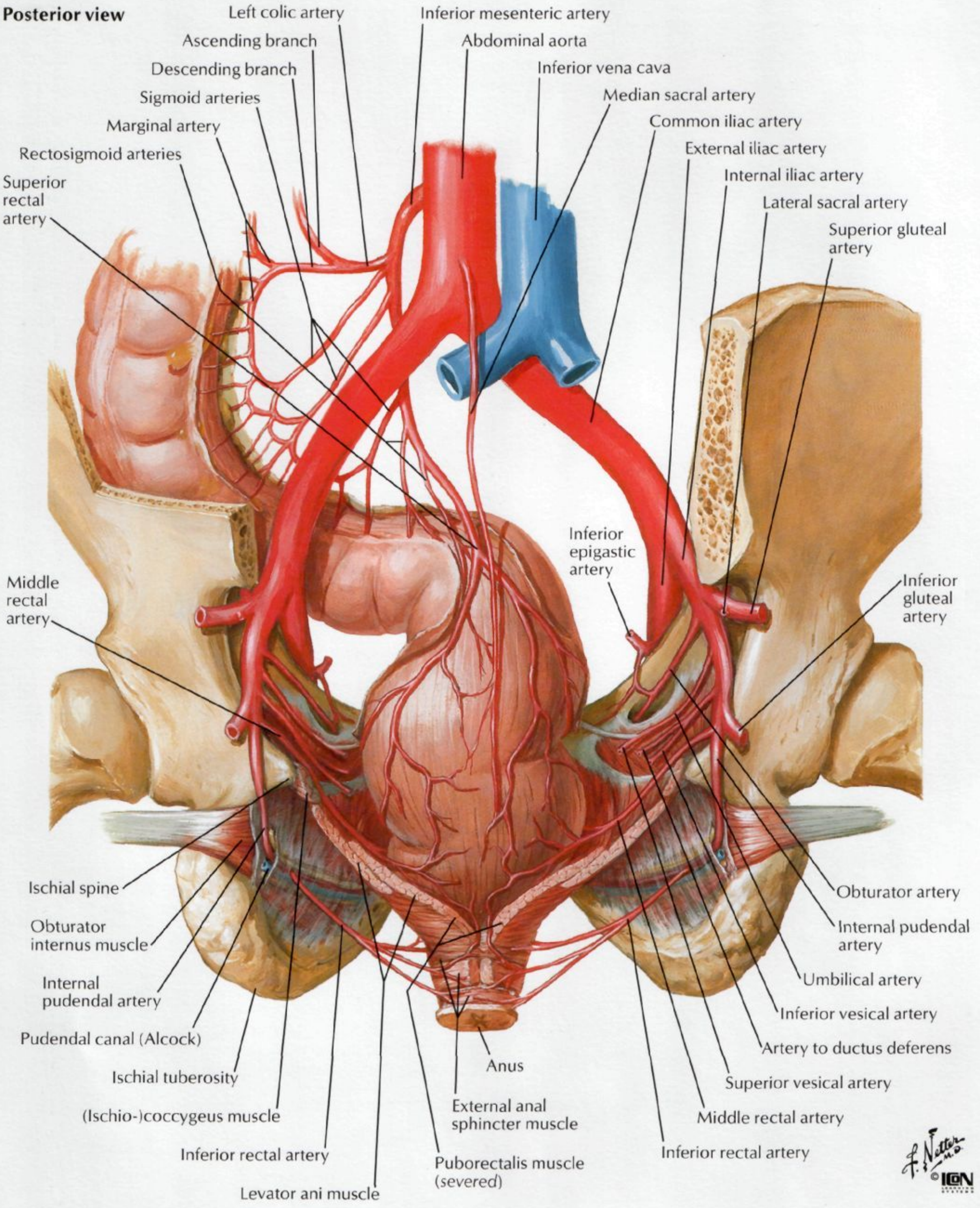
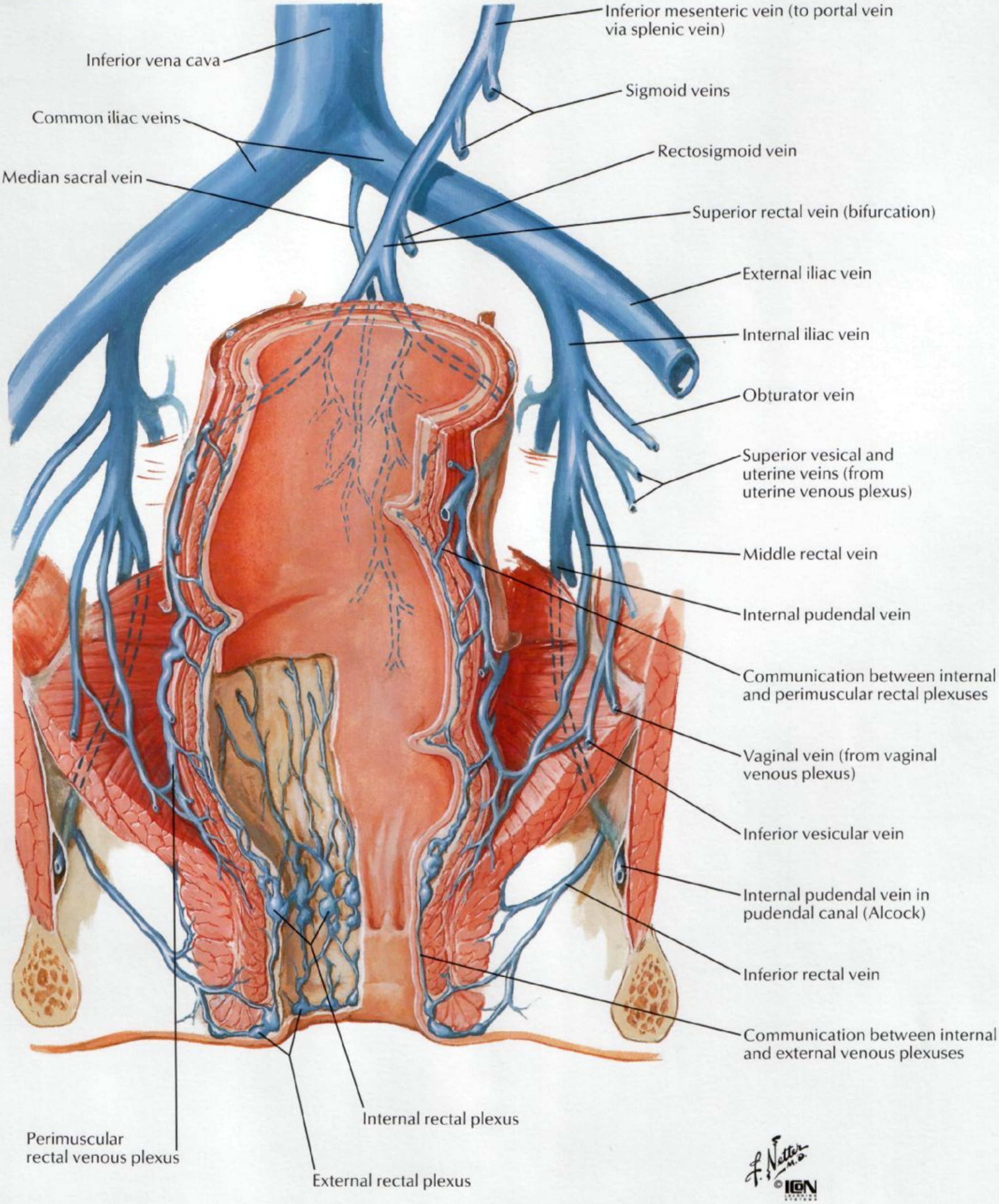
Arteries of Rectum and Anal Canal



Veins of Rectum and Anal Canal

Anterior view


Inferior mesenteric vein (to portal vein via splenic vein)
Inferior vena cava
Sigmoid veins
Common iliac veins
Rectosigmoid vein
Median sacral vein
Superior rectal vein (bifurcation)
External iliac vein
Internal iliac vein
Obturator vein
Superior vesical and uterine veins (from uterine venous plexus)
Middle rectal vein
Internal pudendal vein
Communication between internal and perimuscular rectal plexuses
Vaginal vein (from vaginal venous plexus)
Inferior vesicular vein
Internal pudendal vein in pudendal canal (Alcock)
Inferior rectal vein
Communication between internal and external venous plexuses
Internal rectal plexus
Perimuscular rectal venous plexus
External rectal plexus
F. Netter M.D.
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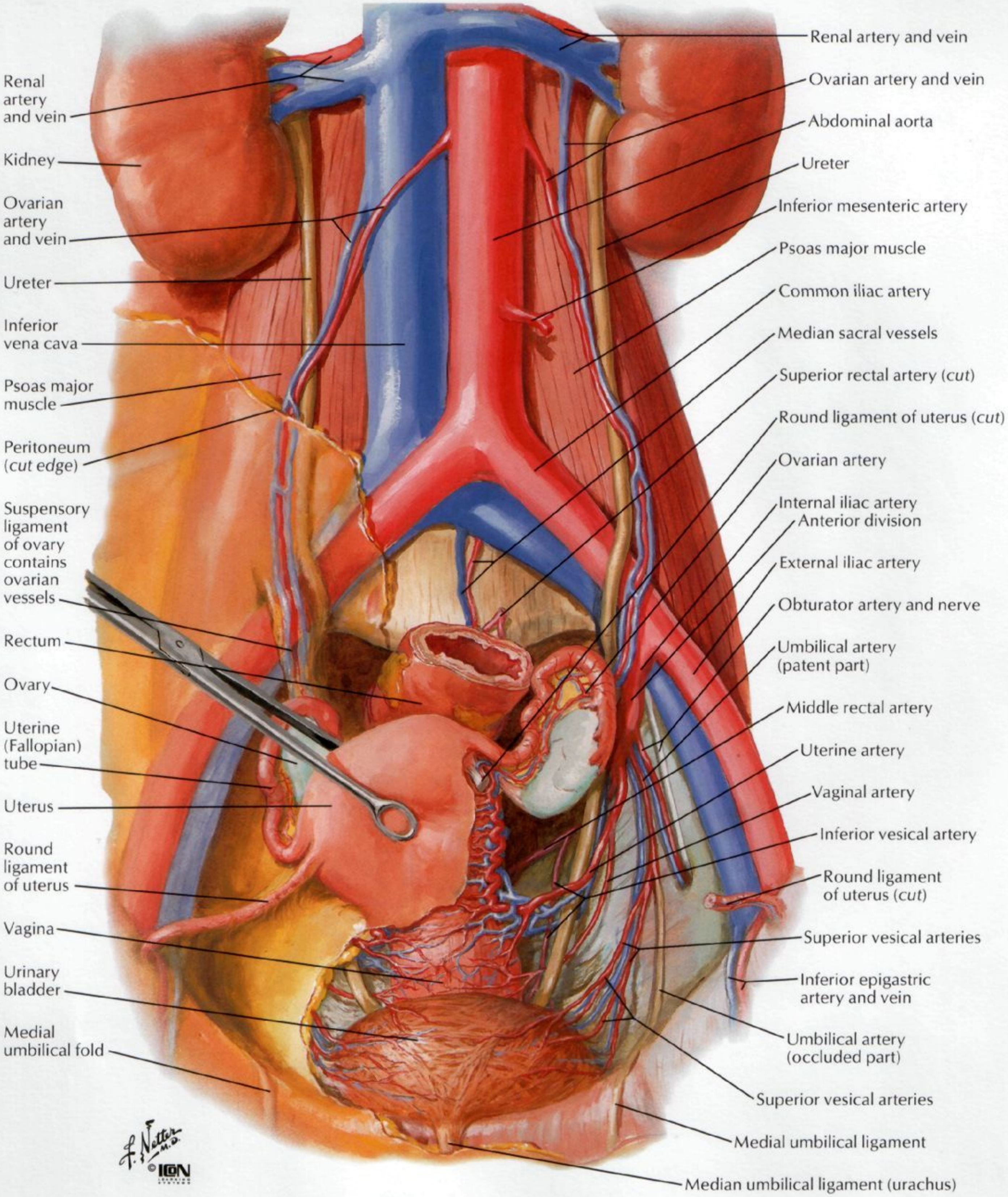
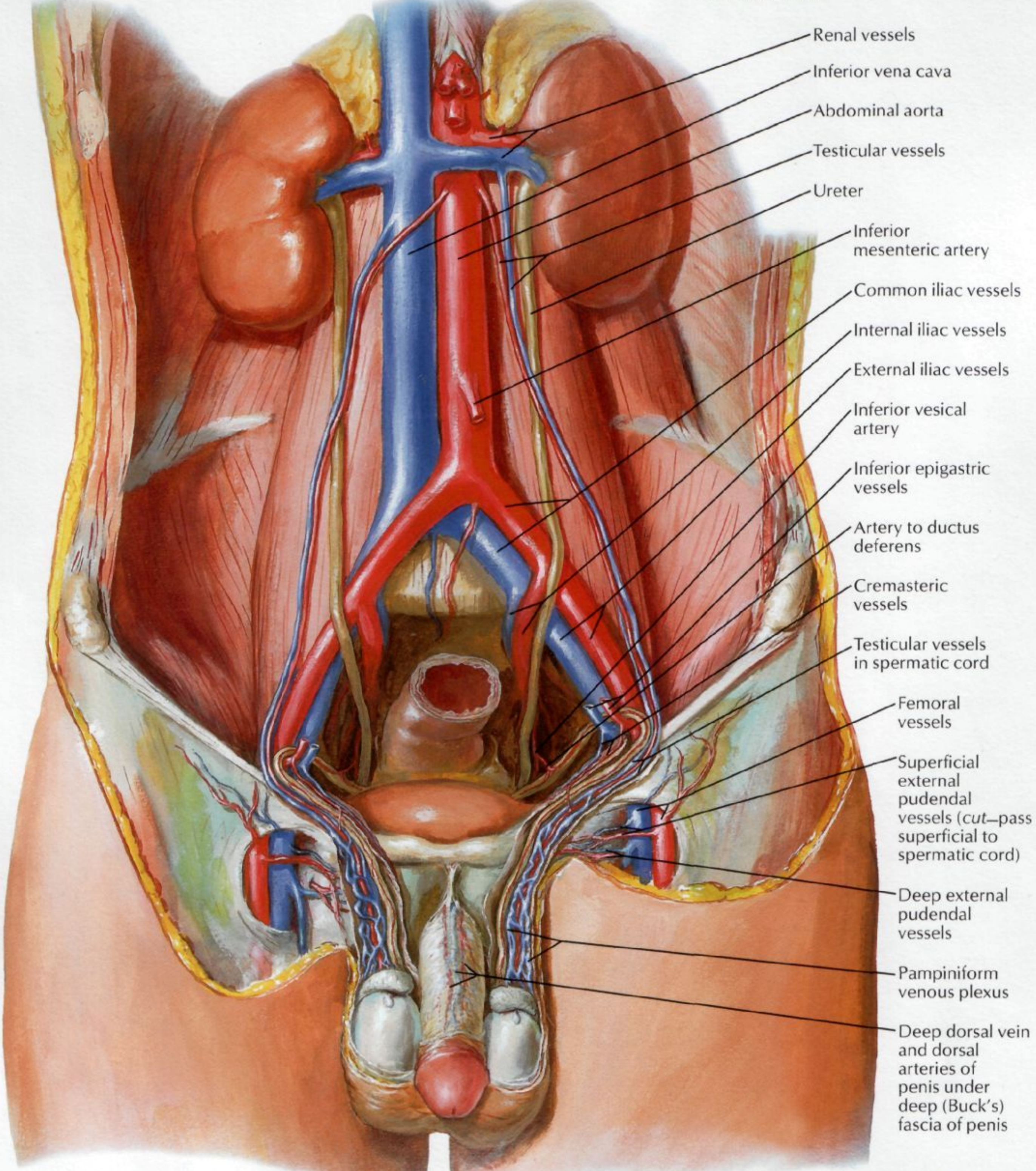
Arteries and Veins of Pelvic Organs: Female

Anterior view



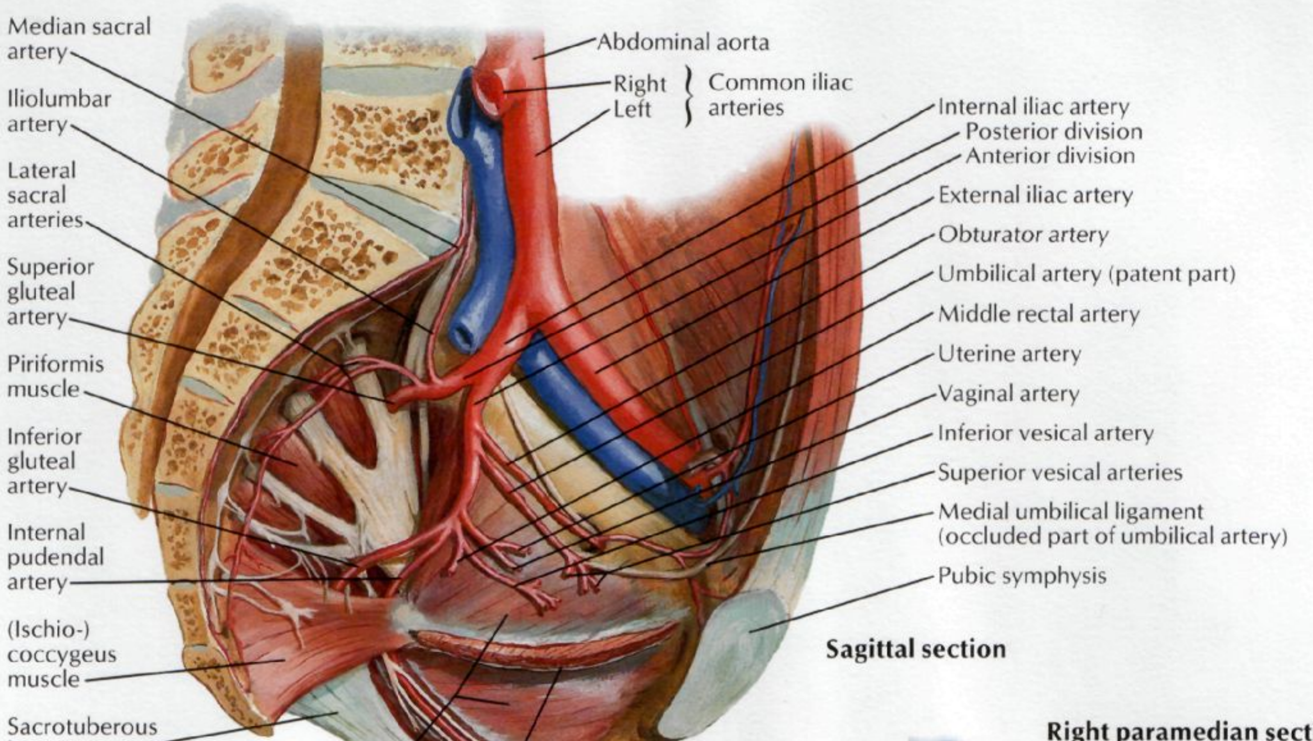
Arteries and Veins of Testis



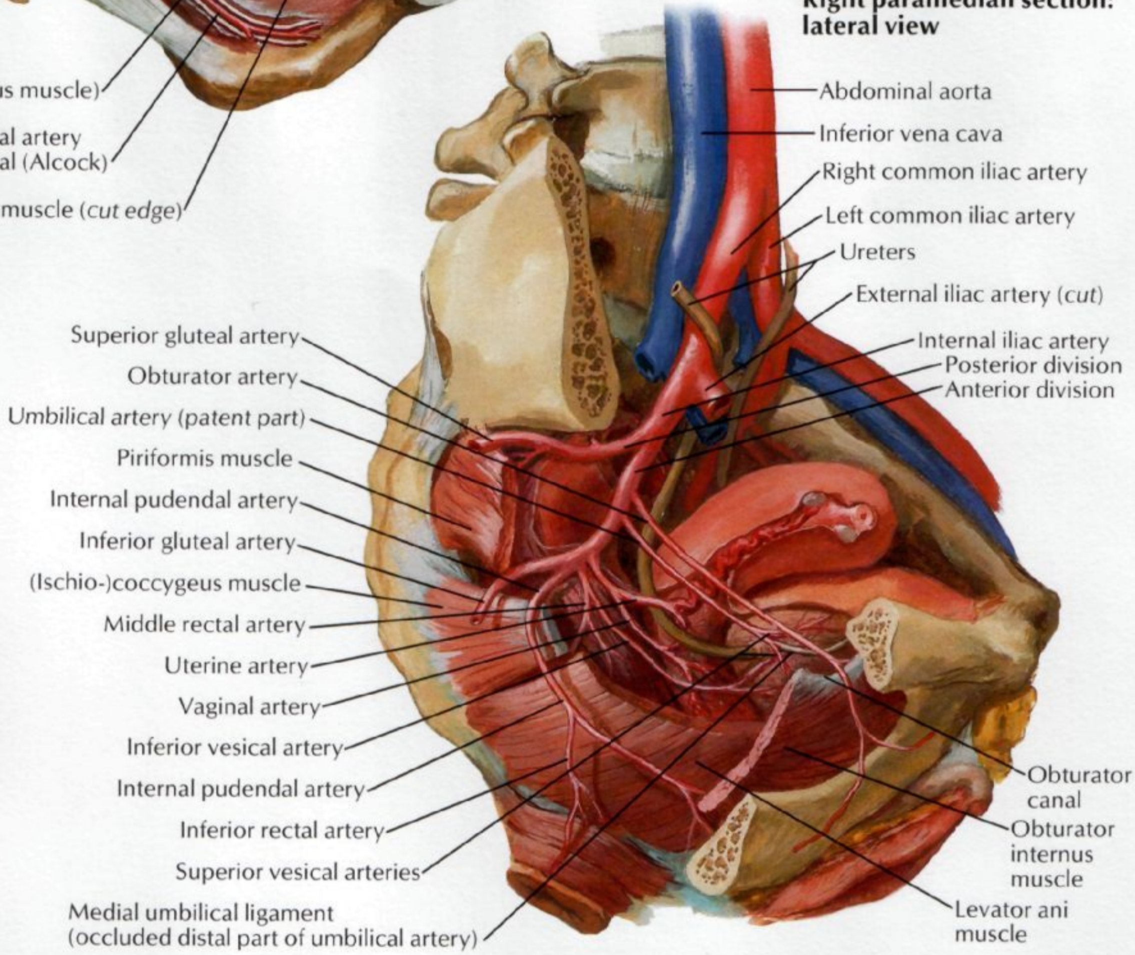
Anterior view

Renal vessels
Inferior vena cava
Abdominal aorta
Testicular vessels
Ureter
Inferior mesenteric artery
Common iliac vessels
Internal iliac vessels
External iliac vessels
Inferior vesical artery
Inferior epigastric vessels
Artery to ductus deferens
Cremasteric vessels
Testicular vessels in spermatic cord
Femoral vessels
Superficial external pudendal vessels (*cut*—pass superficial to spermatic cord)
Deep external pudendal vessels
Pampiniform venous plexus
Deep dorsal vein and dorsal arteries of penis under deep (Buck's) fascia of penis

Arteries and Veins of Pelvis: Female



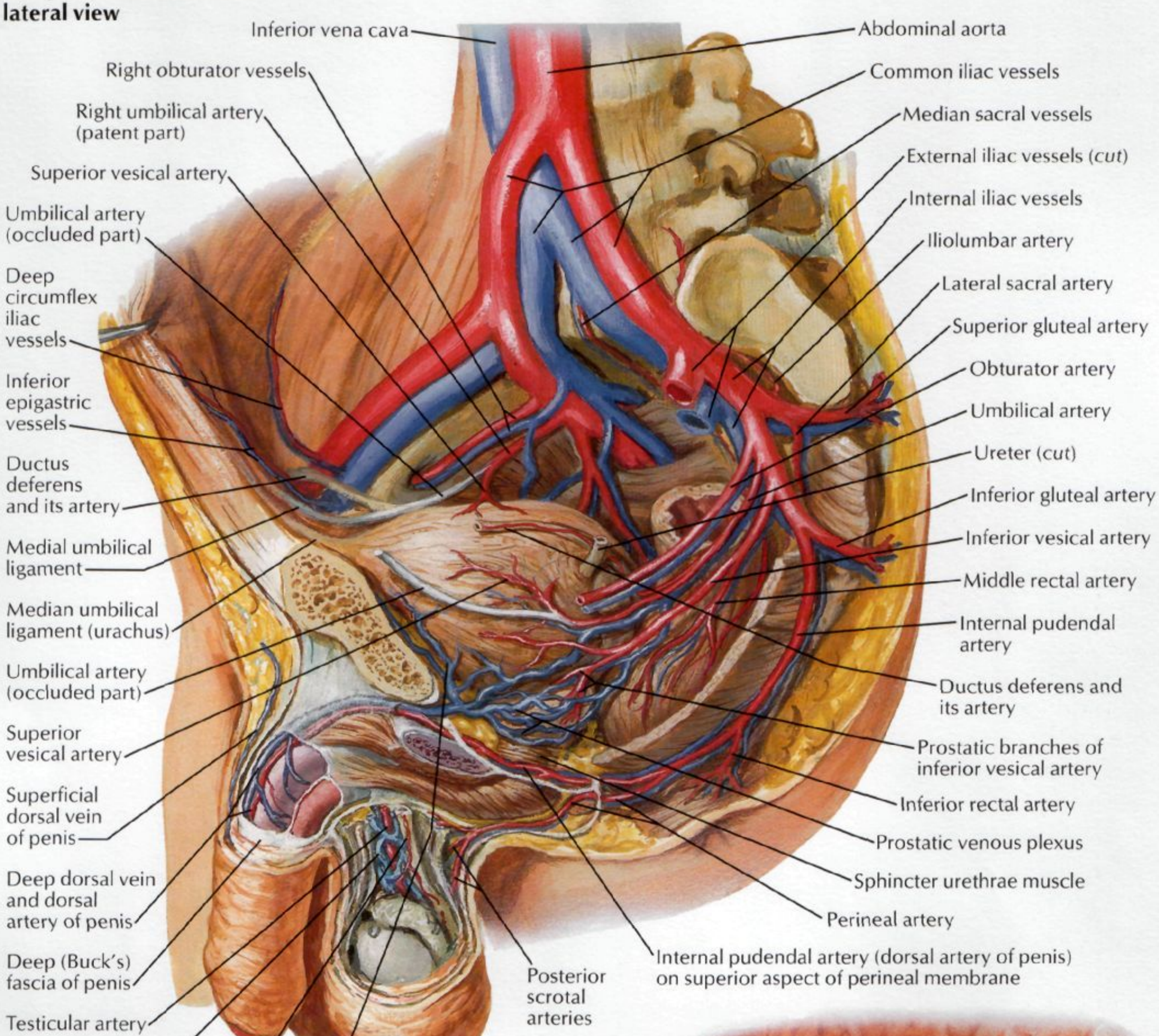
Sagittal section

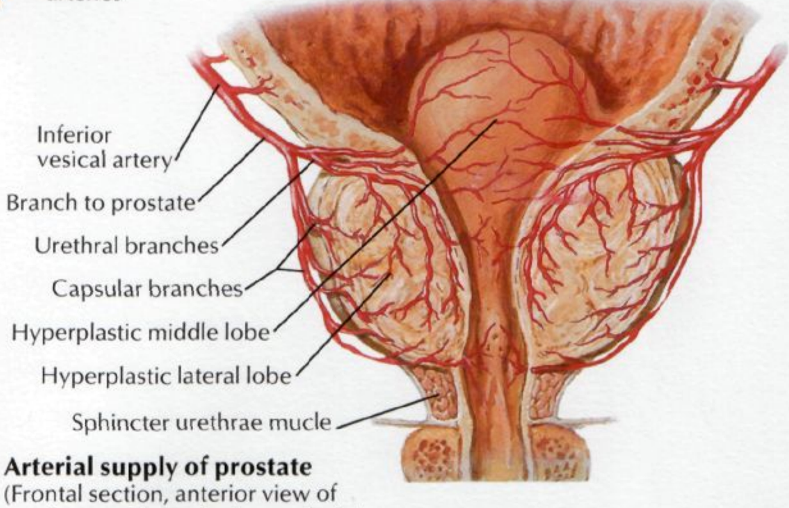


Right paramedian section: lateral view

Arteries and Veins of Pelvis: Male

Left paramedian section: lateral view


Inferior vena cava
Right obturator vessels
Right umbilical artery (patent part)
Superior vesical artery
Umbilical artery (occluded part)
Deep circumflex iliac vessels
Inferior epigastric vessels
Ductus deferens and its artery
Medial umbilical ligament
Median umbilical ligament (urachus)
Umbilical artery (occluded part)
Superior vesical artery
Superficial dorsal vein of penis
Deep dorsal vein and dorsal artery of penis
Deep (Buck's) fascia of penis
Testicular artery
Pampiniform (venous) plexus
Artery to ductus deferens
Vesical (retropubic) venous plexus
Abdominal aorta
Common iliac vessels
Median sacral vessels
External iliac vessels (*cut*)
Internal iliac vessels
Iliolumbar artery
Lateral sacral artery
Superior gluteal artery
Obturator artery
Umbilical artery
Ureter (*cut*)
Inferior gluteal artery
Inferior vesical artery
Middle rectal artery
Internal pudendal artery
Ductus deferens and its artery
Prostatic branches of inferior vesical artery
Inferior rectal artery
Prostatic venous plexus
Sphincter urethrae muscle
Perineal artery
Internal pudendal artery (dorsal artery of penis) on superior aspect of perineal membrane
Posterior scrotal arteries



Arterial supply of prostate
(Frontal section, anterior view of specimen with benign hyperplasia)

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C. Machado M.D.
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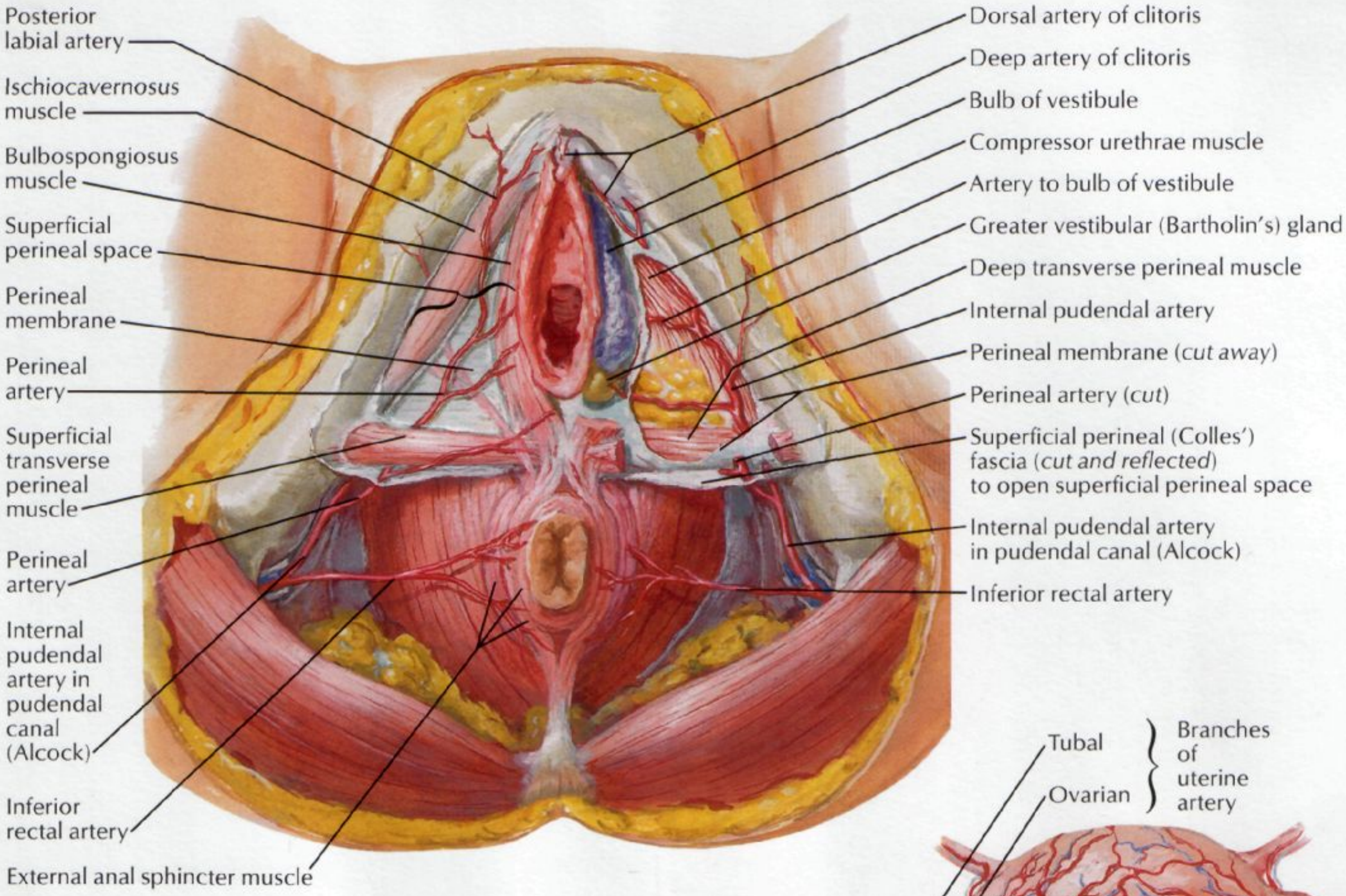
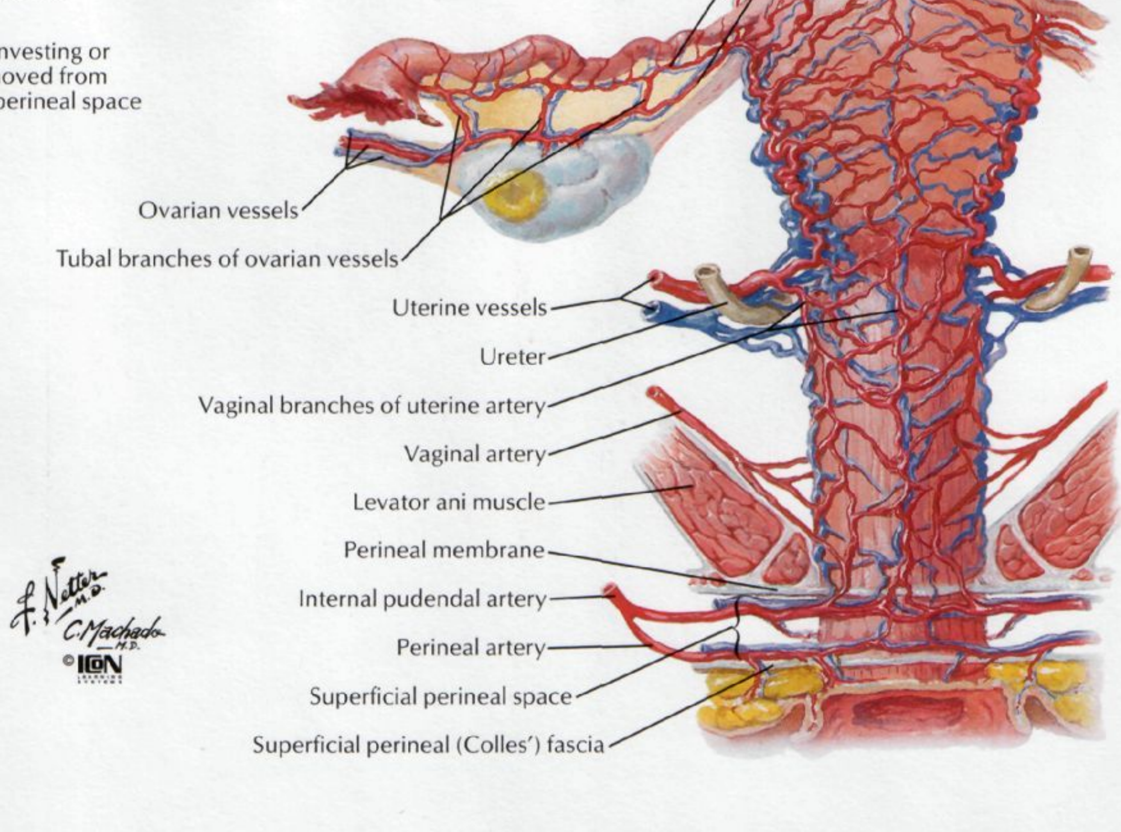
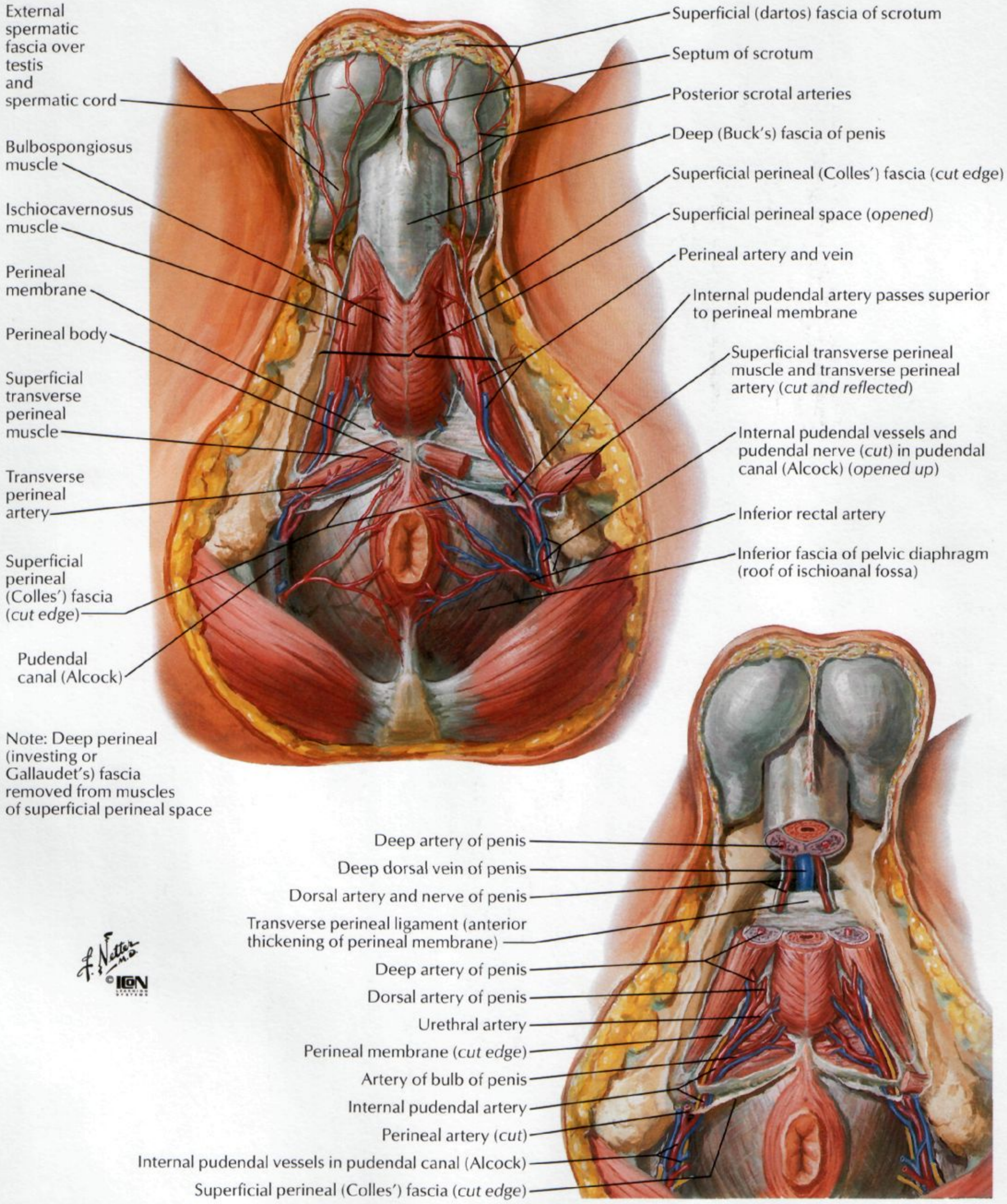
Arteries and Veins of Perineum and Uterus


Posterior labial artery
Ischiocavernosus muscle
Bulbospongiosus muscle
Superficial perineal space
Perineal membrane
Perineal artery
Superficial transverse perineal muscle
Perineal artery
Internal pudendal artery in pudendal canal (Alcock)
Inferior rectal artery
External anal sphincter muscle
Dorsal artery of clitoris
Deep artery of clitoris
Bulb of vestibule
Compressor urethrae muscle
Artery to bulb of vestibule
Greater vestibular (Bartholin's) gland
Deep transverse perineal muscle
Internal pudendal artery
Perineal membrane (*cut away*)
Perineal artery (*cut*)
Superficial perineal (Colles') fascia (*cut and reflected*) to open superficial perineal space
Internal pudendal artery in pudendal canal (Alcock)
Inferior rectal artery
Tubal
Ovarian
Branches of uterine artery

Note: Deep perineal (investing or Gallaudet's) fascia removed from muscles of superficial perineal space



Arteries and Veins of Perineum: Male


External spermatic fascia over testis and spermatic cord
Bulbospongiosus muscle
Ischiocavernosus muscle
Perineal membrane
Perineal body
Superficial transverse perineal muscle
Transverse perineal artery
Superficial perineal (Colles') fascia (*cut edge*)
Pudendal canal (Alcock)
Superficial (dartos) fascia of scrotum
Septum of scrotum
Posterior scrotal arteries
Deep (Buck's) fascia of penis
Superficial perineal (Colles') fascia (*cut edge*)
Superficial perineal space (*opened*)
Perineal artery and vein
Internal pudendal artery passes superior to perineal membrane
Superficial transverse perineal muscle and transverse perineal artery (*cut and reflected*)
Internal pudendal vessels and pudendal nerve (*cut*) in pudendal canal (Alcock) (*opened up*)
Inferior rectal artery
Inferior fascia of pelvic diaphragm (roof of ischioanal fossa)
Deep artery of penis
Deep dorsal vein of penis
Dorsal artery and nerve of penis
Transverse perineal ligament (anterior thickening of perineal membrane)
Deep artery of penis
Dorsal artery of penis
Urethral artery
Perineal membrane (*cut edge*)
Artery of bulb of penis
Internal pudendal artery
Perineal artery (*cut*)
Internal pudendal vessels in pudendal canal (Alcock)
Superficial perineal (Colles') fascia (*cut edge*)
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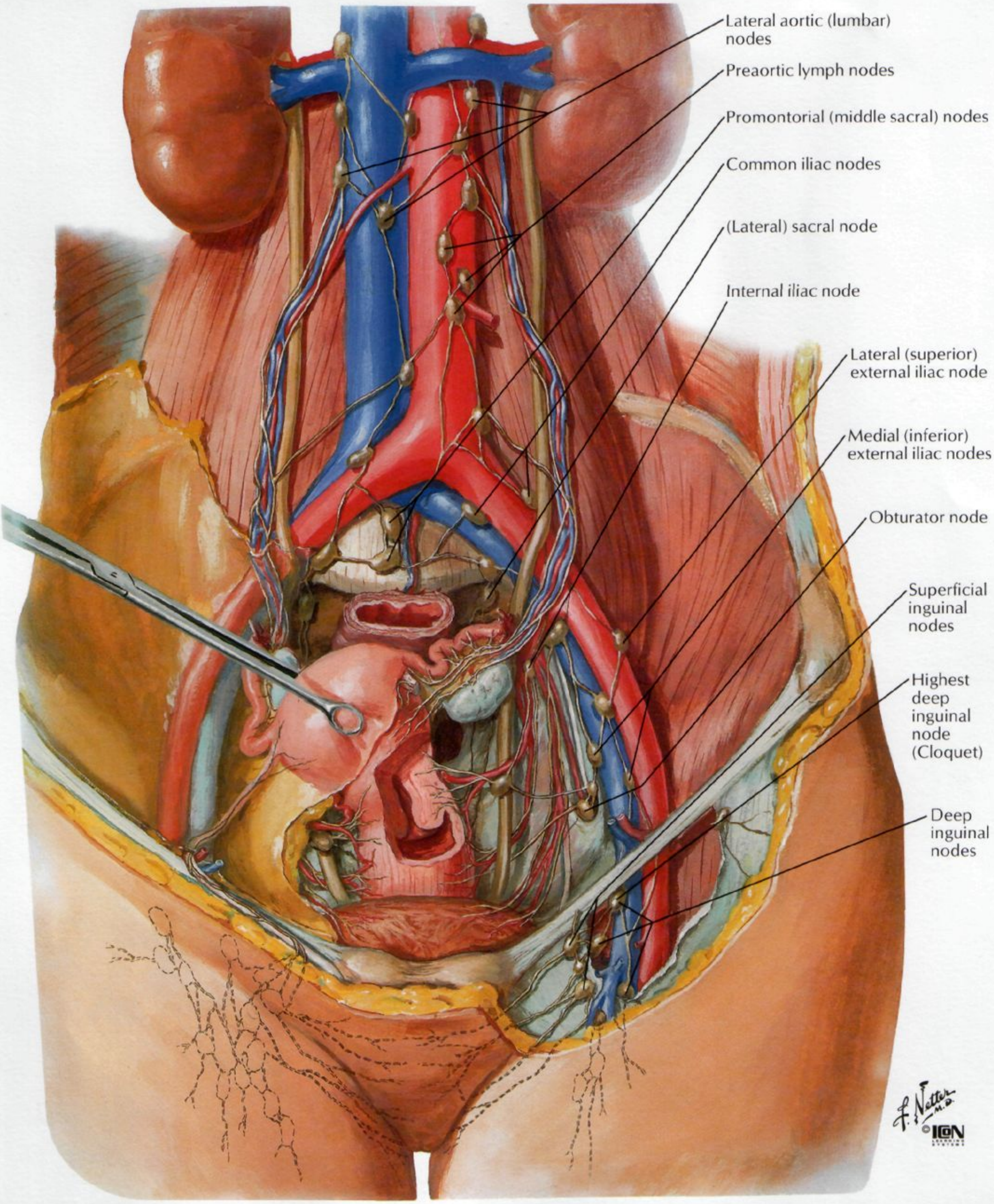
Note: Deep perineal (investing or Gallaudet's) fascia removed from muscles of superficial perineal space

Lymph Vessels and Nodes of Pelvis and Genitalia: Female


Lateral aortic (lumbar) nodes
Preaortic lymph nodes
Promontorial (middle sacral) nodes
Common iliac nodes
(Lateral) sacral node
Internal iliac node
Lateral (superior) external iliac node
Medial (inferior) external iliac nodes
Obturator node
Superficial inguinal nodes
Highest deep inguinal node (Cloquet)
Deep inguinal nodes
F. Netter M.D.
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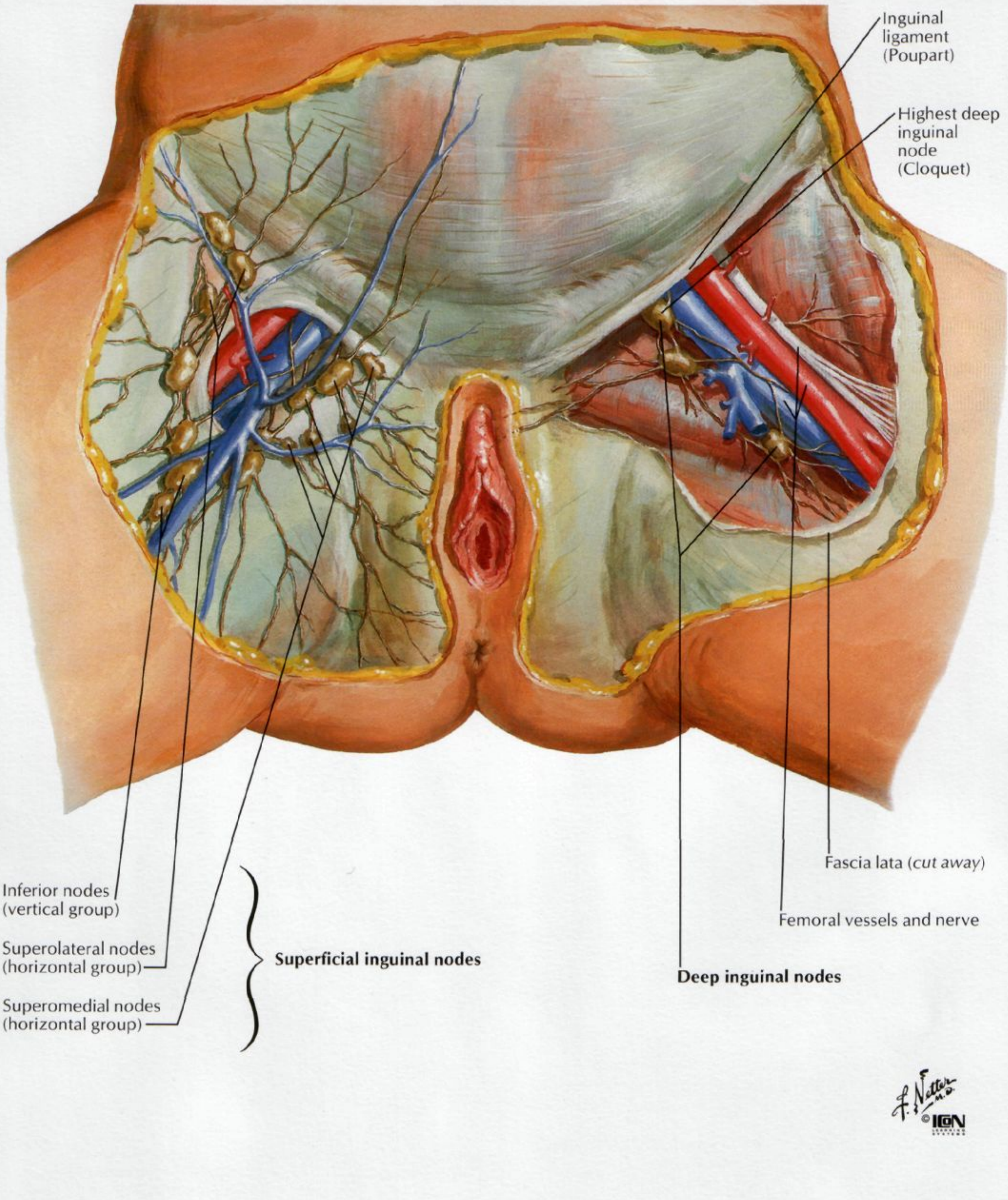
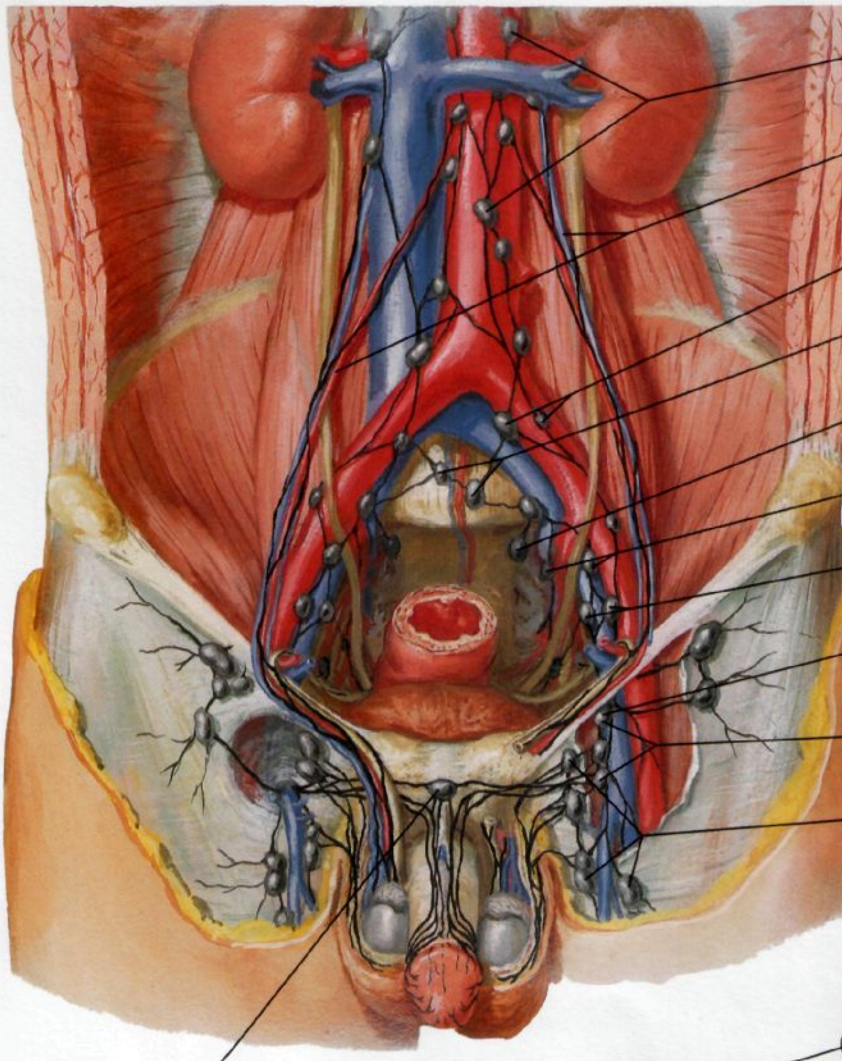
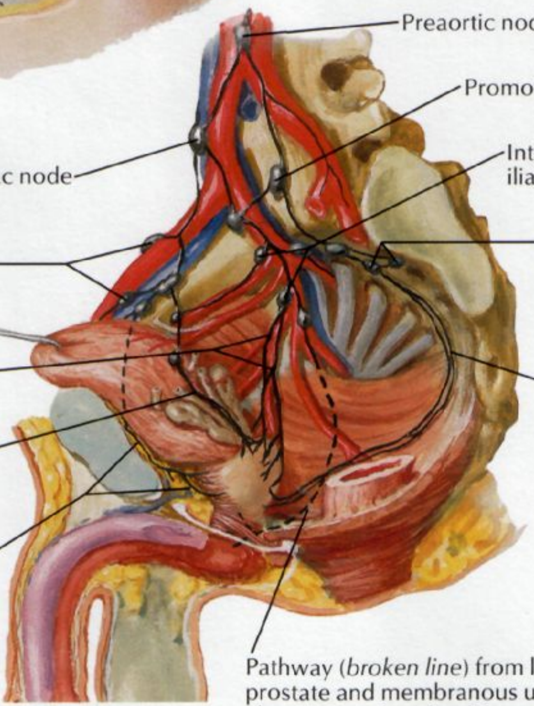
Lymph Vessels and Nodes of Perineum: Female


Inguinal ligament (Poupart)
Highest deep inguinal node (Cloquet)
Fascia lata (*cut away*)
Femoral vessels and nerve
Deep inguinal nodes
Inferior nodes (vertical group)
Superolateral nodes (horizontal group)
Superomedial nodes (horizontal group)
Superficial inguinal nodes

Lymph Vessels and Nodes of Pelvis and Genitalia: Male


Preaortic nodes
Pathways from testes along testicular vessels
Common iliac nodes
Promontorial (middle sacral) nodes
(Lateral) sacral node
Internal iliac nodes
External iliac nodes
Highest deep inguinal node (Cloquet)
Deep inguinal nodes
Superficial inguinal nodes
Presymphyseal node


Preaortic node
Promontorial node
Internal iliac nodes
Common iliac node
(Middle and lateral) sacral nodes
External iliac nodes
Pathway along inferior vesical vessels to internal iliac nodes (principal pathway)
Pathway alongside rectum to (middle and lateral) sacral nodes
Pathway over bladder to external iliac nodes
Prevesical plexus and pathway (*broken line*) to external iliac nodes
Pathway (*broken line*) from lower prostate and membranous urethra along internal pudendal vessels (beneath pelvic diaphragm) to internal iliac nodes

Lymphatic drainage from prostate

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C. Machado M.D.
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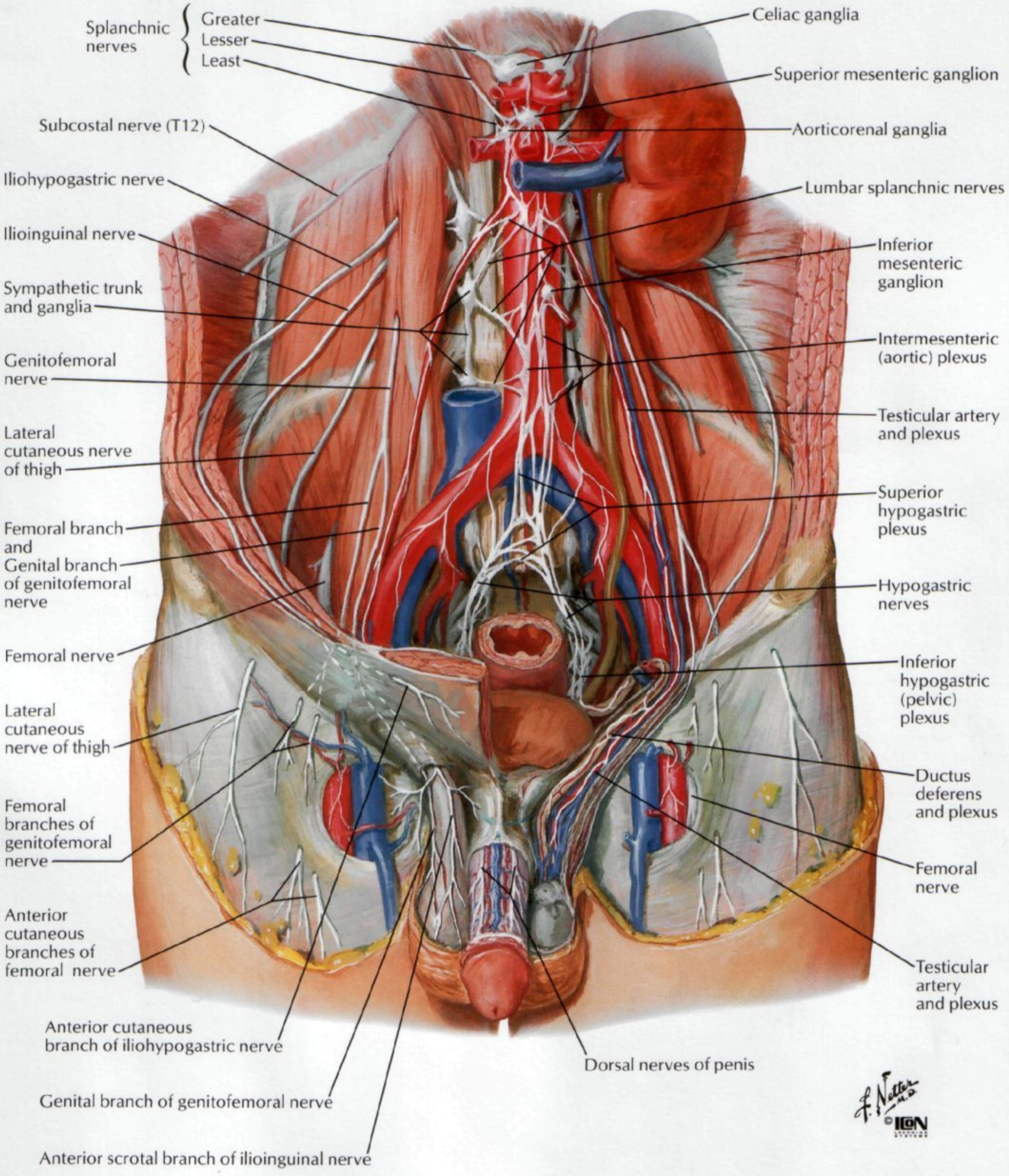
Nerves of External Genitalia: Male

SEE ALSO PLATES 159, 308


Splanchnic nerves
Greater
Lesser
Least
Celiac ganglia
Superior mesenteric ganglion
Subcostal nerve (T12)
Aorticorenal ganglia
Iliohypogastric nerve
Lumbar splanchnic nerves
Ilioinguinal nerve
Inferior mesenteric ganglion
Sympathetic trunk and ganglia
Genitofemoral nerve
Intermesenteric (aortic) plexus
Testicular artery and plexus
Lateral cutaneous nerve of thigh
Superior hypogastric plexus
Femoral branch and Genital branch of genitofemoral nerve
Hypogastric nerves
Femoral nerve
Inferior hypogastric (pelvic) plexus
Lateral cutaneous nerve of thigh
Ductus deferens and plexus
Femoral branches of genitofemoral nerve
Femoral nerve
Anterior cutaneous branches of femoral nerve
Testicular artery and plexus
Anterior cutaneous branch of iliohypogastric nerve
Dorsal nerves of penis
Genital branch of genitofemoral nerve
Anterior scrotal branch of ilioinguinal nerve
F. Netter M.D.
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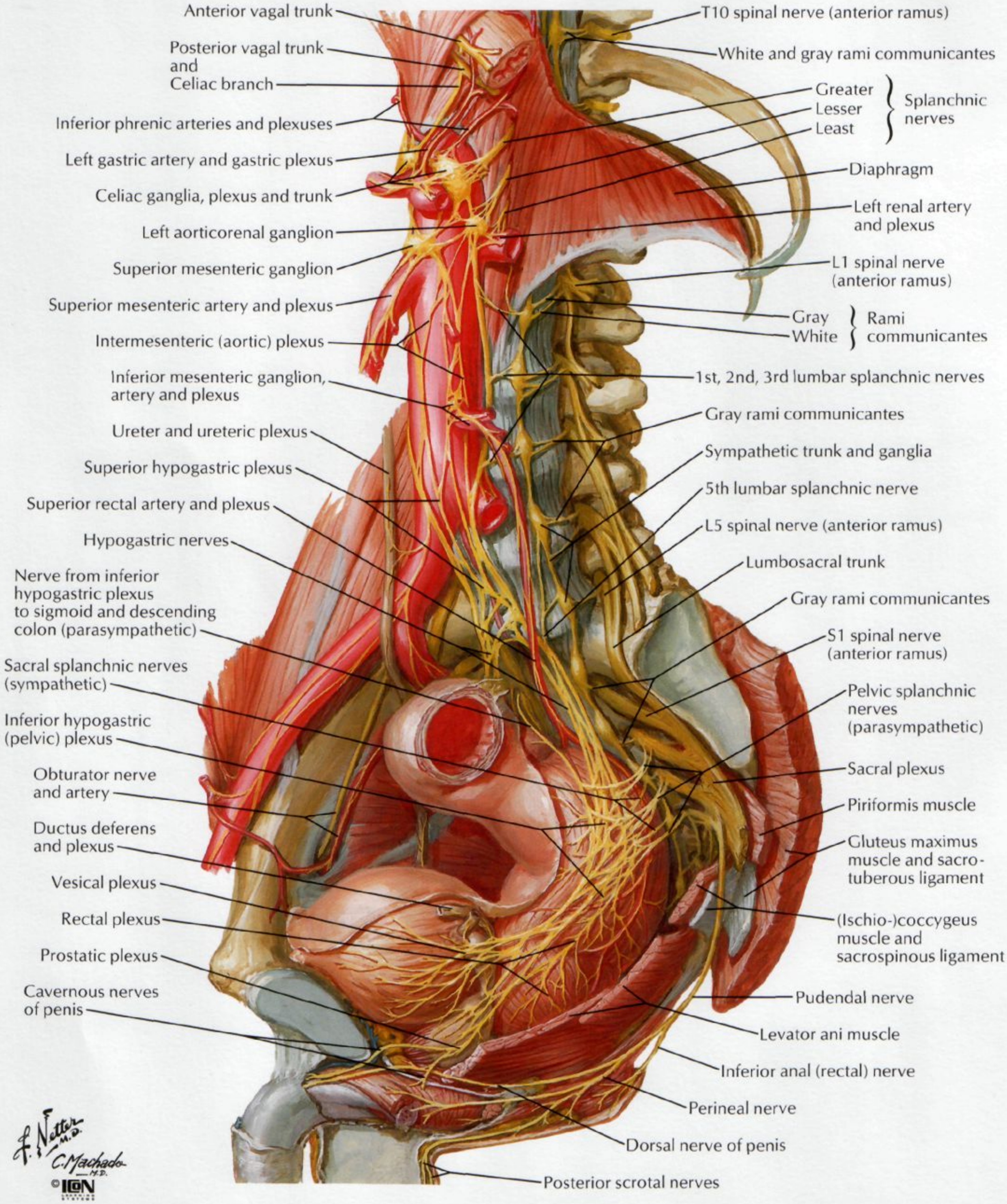
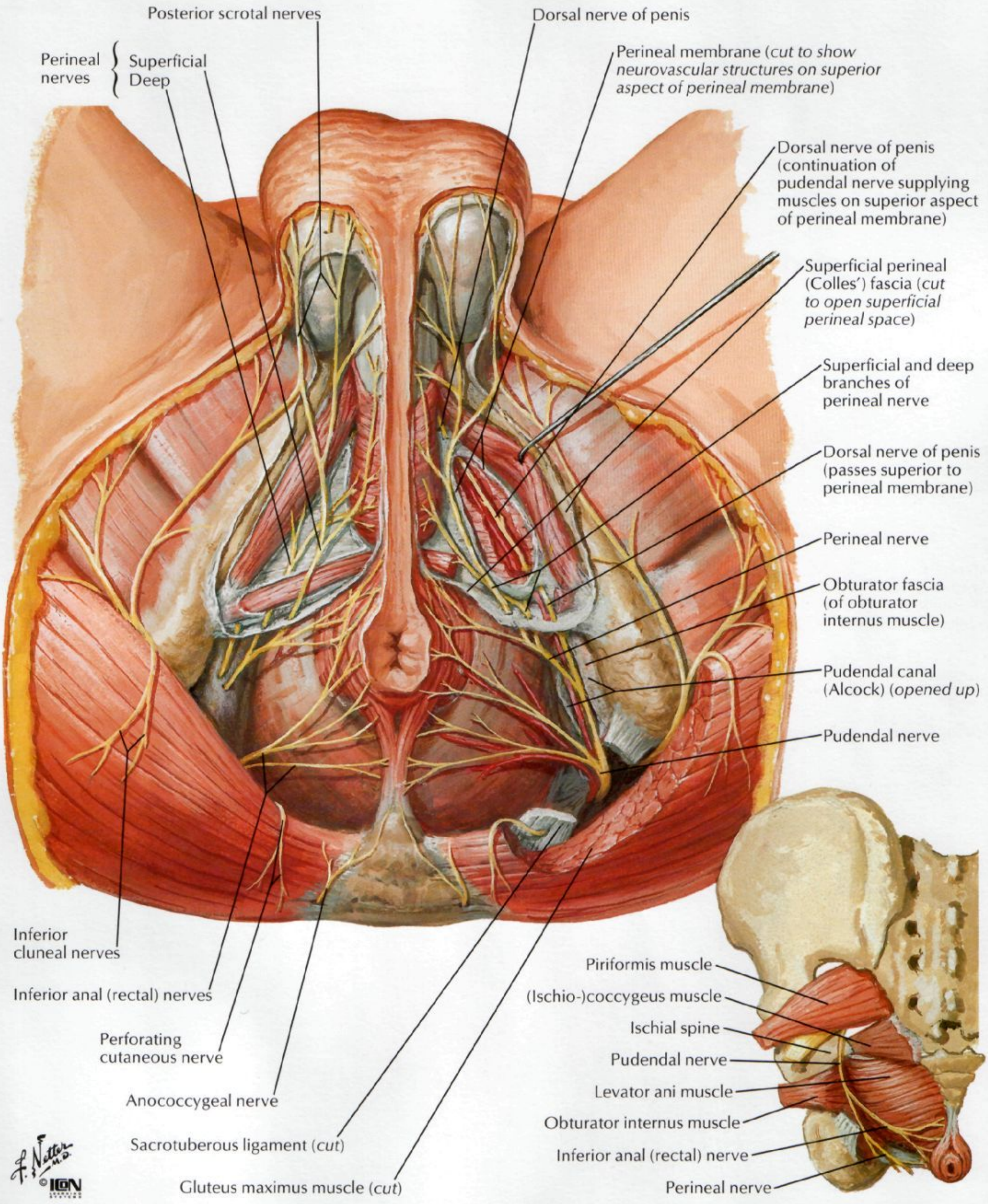
Nerves of Pelvic Viscera: Male

SEE ALSO PLATES 159, 308


Anterior vagal trunk
Posterior vagal trunk and Celiac branch
Inferior phrenic arteries and plexuses
Left gastric artery and gastric plexus
Celiac ganglia, plexus and trunk
Left aorticorenal ganglion
Superior mesenteric ganglion
Superior mesenteric artery and plexus
Intermesenteric (aortic) plexus
Inferior mesenteric ganglion, artery and plexus
Ureter and ureteric plexus
Superior hypogastric plexus
Superior rectal artery and plexus
Hypogastric nerves
Nerve from inferior hypogastric plexus to sigmoid and descending colon (parasympathetic)
Sacral splanchnic nerves (sympathetic)
Inferior hypogastric (pelvic) plexus
Obturator nerve and artery
Ductus deferens and plexus
Vesical plexus
Rectal plexus
Prostatic plexus
Cavernous nerves of penis
T10 spinal nerve (anterior ramus)
White and gray rami communicantes
Greater
Lesser
Least
Splanchnic nerves
Diaphragm
Left renal artery and plexus
L1 spinal nerve (anterior ramus)
Gray
White
Rami communicantes
1st, 2nd, 3rd lumbar splanchnic nerves
Gray rami communicantes
Sympathetic trunk and ganglia
5th lumbar splanchnic nerve
L5 spinal nerve (anterior ramus)
Lumbosacral trunk
Gray rami communicantes
S1 spinal nerve (anterior ramus)
Pelvic splanchnic nerves (parasympathetic)
Sacral plexus
Piriformis muscle
Gluteus maximus muscle and sacrotuberous ligament
(Ischio-)coccygeus muscle and sacrospinous ligament
Pudendal nerve
Levator ani muscle
Inferior anal (rectal) nerve
Perineal nerve
Dorsal nerve of penis
Posterior scrotal nerves

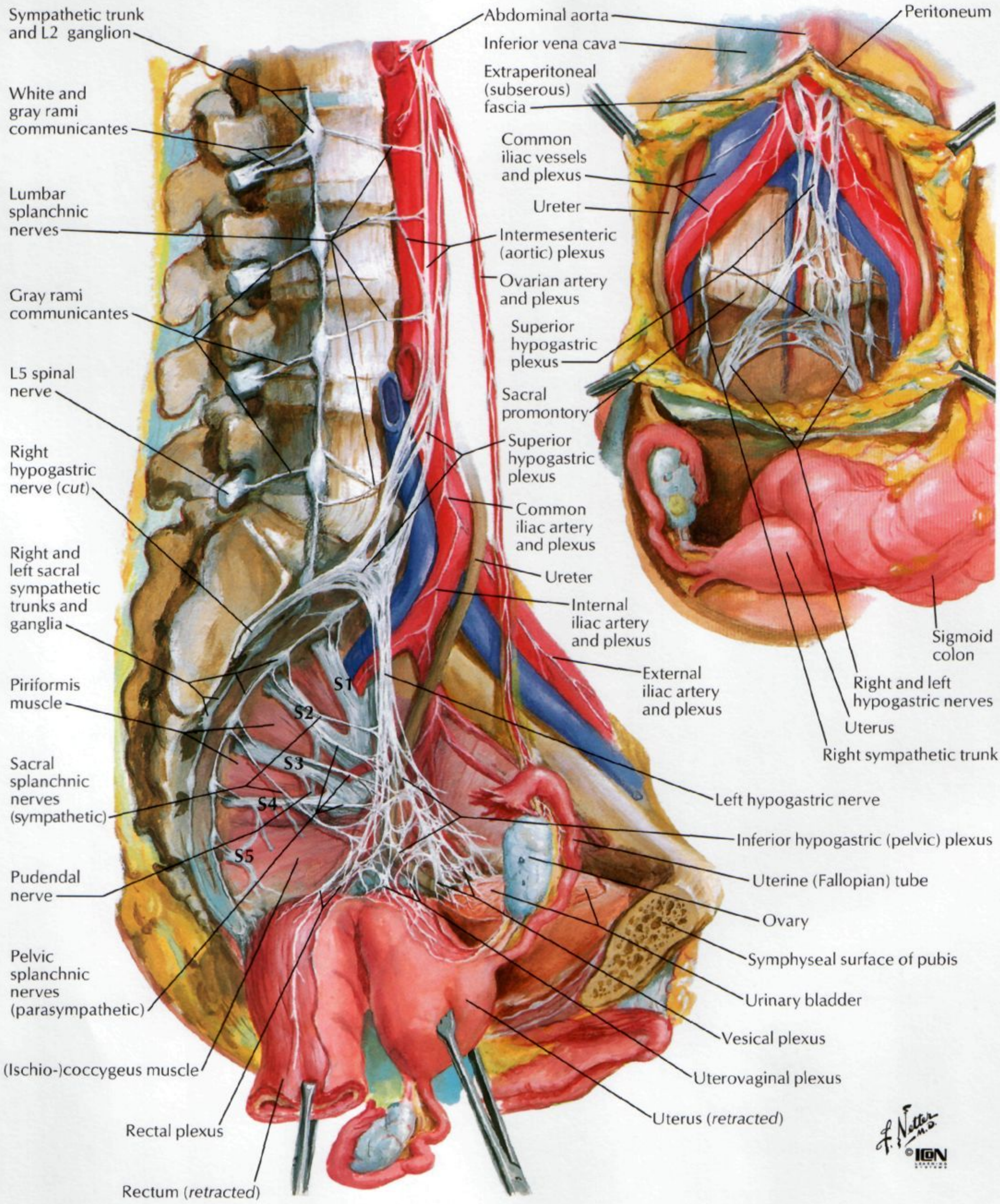
Nerves of Perineum: Male

SEE ALSO PLATE 396


Posterior scrotal nerves
Perineal nerves { Superficial
Deep
Dorsal nerve of penis
Perineal membrane (*cut to show neurovascular structures on superior aspect of perineal membrane*)
Dorsal nerve of penis (continuation of pudendal nerve supplying muscles on superior aspect of perineal membrane)
Superficial perineal (Colles') fascia (*cut to open superficial perineal space*)
Superficial and deep branches of perineal nerve
Dorsal nerve of penis (passes superior to perineal membrane)
Perineal nerve
Obturator fascia (of obturator internus muscle)
Pudendal canal (Alcock) (*opened up*)
Pudendal nerve
Inferior cluneal nerves
Inferior anal (rectal) nerves
Perforating cutaneous nerve
Anococcygeal nerve
Sacrotuberous ligament (*cut*)
Gluteus maximus muscle (*cut*)
Piriformis muscle
(Ischio-)coccygeus muscle
Ischial spine
Pudendal nerve
Levator ani muscle
Obturator internus muscle
Inferior anal (rectal) nerve
Perineal nerve

Nerves of Pelvic Viscera: Female

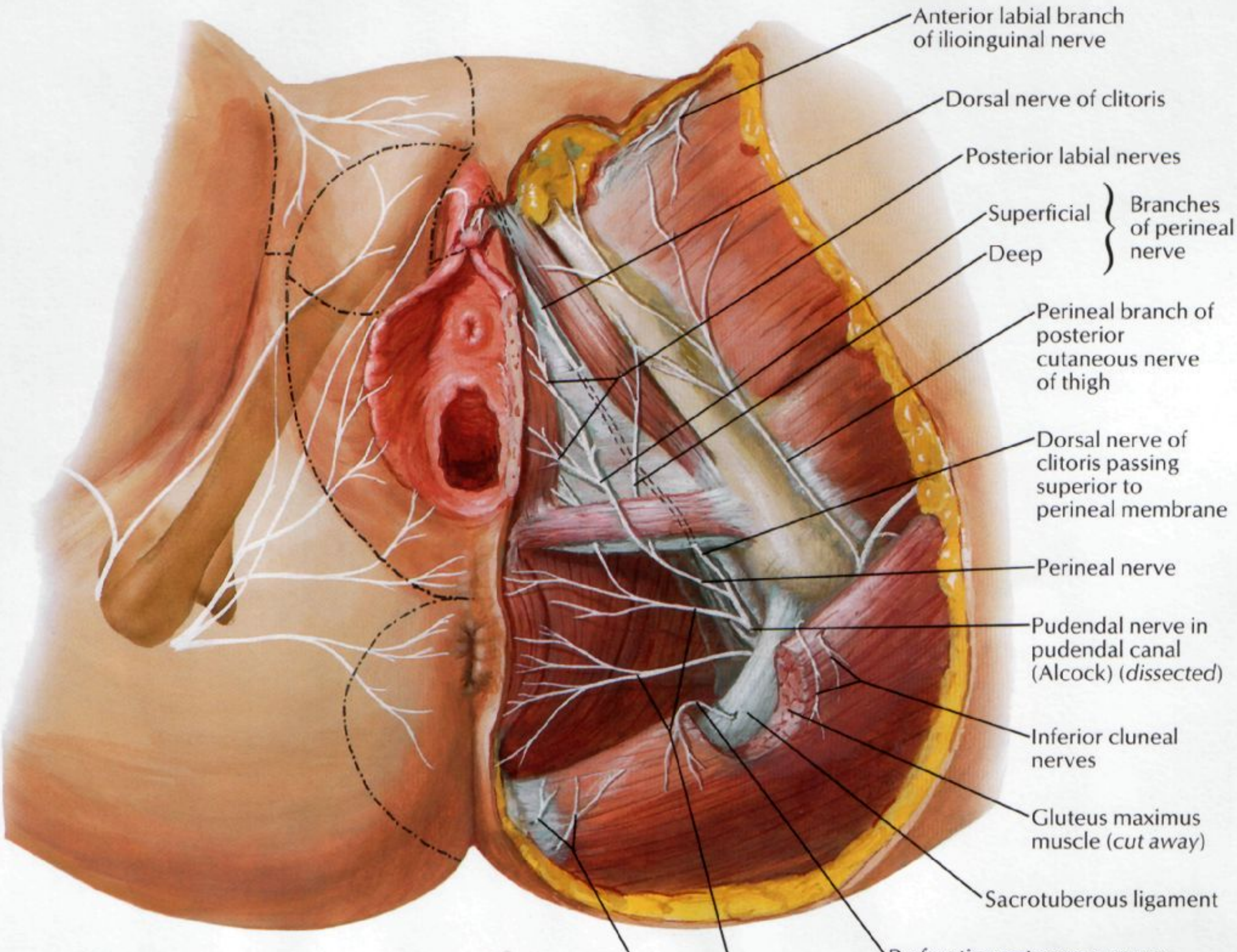
SEE ALSO PLATES 159, 308

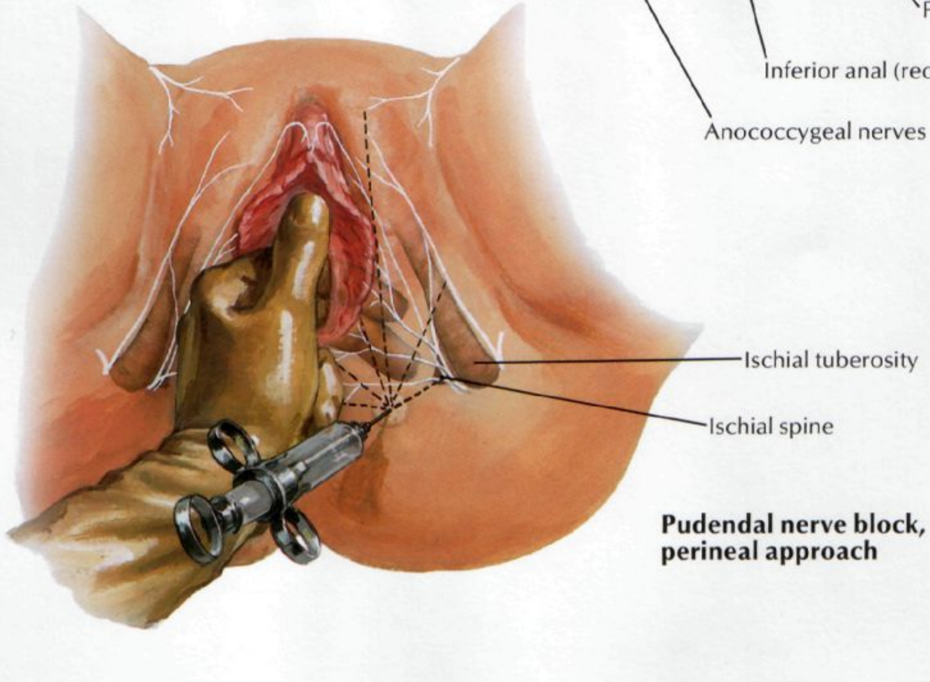


Sympathetic trunk and L2 ganglion
White and gray rami communicantes
Lumbar splanchnic nerves
Gray rami communicantes
L5 spinal nerve
Right hypogastric nerve (*cut*)
Right and left sacral sympathetic trunks and ganglia
Piriformis muscle
Sacral splanchnic nerves (sympathetic)
Pudendal nerve
Pelvic splanchnic nerves (parasympathetic)
(Ischio-)coccygeus muscle
Rectal plexus
Rectum (*retracted*)
S1
S2
S3
S4
S5
Abdominal aorta
Inferior vena cava
Extraperitoneal (subserous) fascia
Common iliac vessels and plexus
Ureter
Intermesenteric (aortic) plexus
Ovarian artery and plexus
Superior hypogastric plexus
Sacral promontory
Superior hypogastric plexus
Common iliac artery and plexus
Ureter
Internal iliac artery and plexus
External iliac artery and plexus
Peritoneum
Sigmoid colon
Right and left hypogastric nerves
Uterus
Right sympathetic trunk
Left hypogastric nerve
Inferior hypogastric (pelvic) plexus
Uterine (Fallopian) tube
Ovary
Symphyseal surface of pubis
Urinary bladder
Vesical plexus
Uterovaginal plexus
Uterus (*retracted*)

Nerves of Perineum and External Genitalia: Female

SEE ALSO PLATE 395


Anterior labial branch of ilioinguinal nerve
Dorsal nerve of clitoris
Posterior labial nerves
Superficial
Deep
Branches of perineal nerve
Perineal branch of posterior cutaneous nerve of thigh
Dorsal nerve of clitoris passing superior to perineal membrane
Perineal nerve
Pudendal nerve in pudendal canal (Alcock) (*dissected*)
Inferior cluneal nerves
Gluteus maximus muscle (*cut away*)
Sacrotuberous ligament
Perforating cutaneous nerve
Inferior anal (rectal) nerves
Anococcygeal nerves

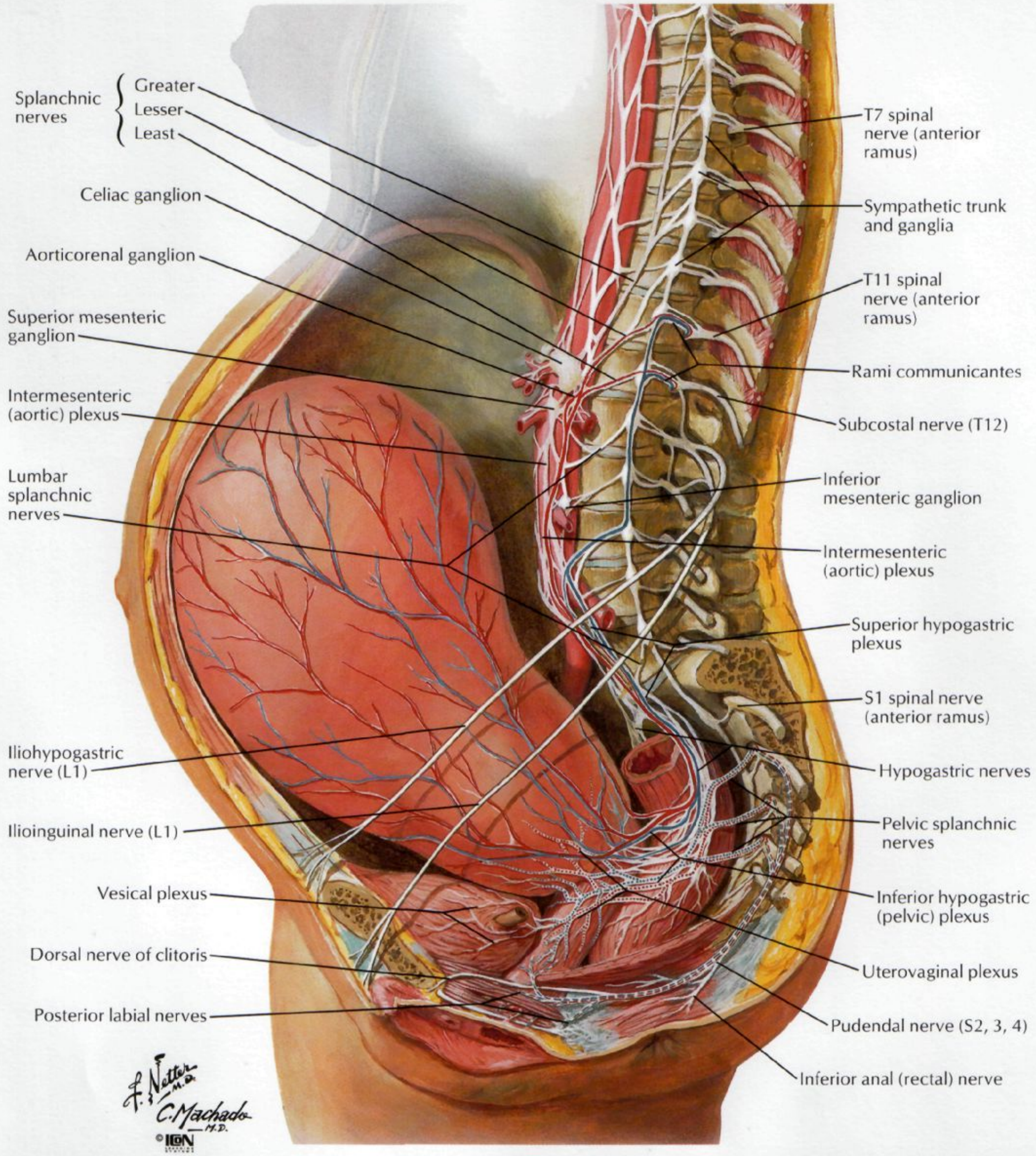


Pudendal nerve block, perineal approach

F. Netter M.D.

Neuropathways in Parturition

SEE ALSO PLATE 159


Splanchnic nerves
Greater
Lesser
Least
Celiac ganglion
Aorticorenal ganglion
Superior mesenteric ganglion
Intermesenteric (aortic) plexus
Lumbar splanchnic nerves
Iliohypogastric nerve (L1)
Ilioinguinal nerve (L1)
Vesical plexus
Dorsal nerve of clitoris
Posterior labial nerves
T7 spinal nerve (anterior ramus)
Sympathetic trunk and ganglia
T11 spinal nerve (anterior ramus)
Rami communicantes
Subcostal nerve (T12)
Inferior mesenteric ganglion
Intermesenteric (aortic) plexus
Superior hypogastric plexus
S1 spinal nerve (anterior ramus)
Hypogastric nerves
Pelvic splanchnic nerves
Inferior hypogastric (pelvic) plexus
Uterovaginal plexus
Pudendal nerve (S2, 3, 4)
Inferior anal (rectal) nerve
F. Netter M.D.
C. Machado M.D.
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——— Sensory fibers from uterine body and fundus accompany sympathetic fibers via hypogastric plexuses to T11, 12 (L1?)

——— Motor fibers to uterine body and fundus (sympathetic)

·········· Sensory fibers from cervix and upper vagina accompany pelvic splanchnic nerves (parasympathetic) to S2, 3, 4

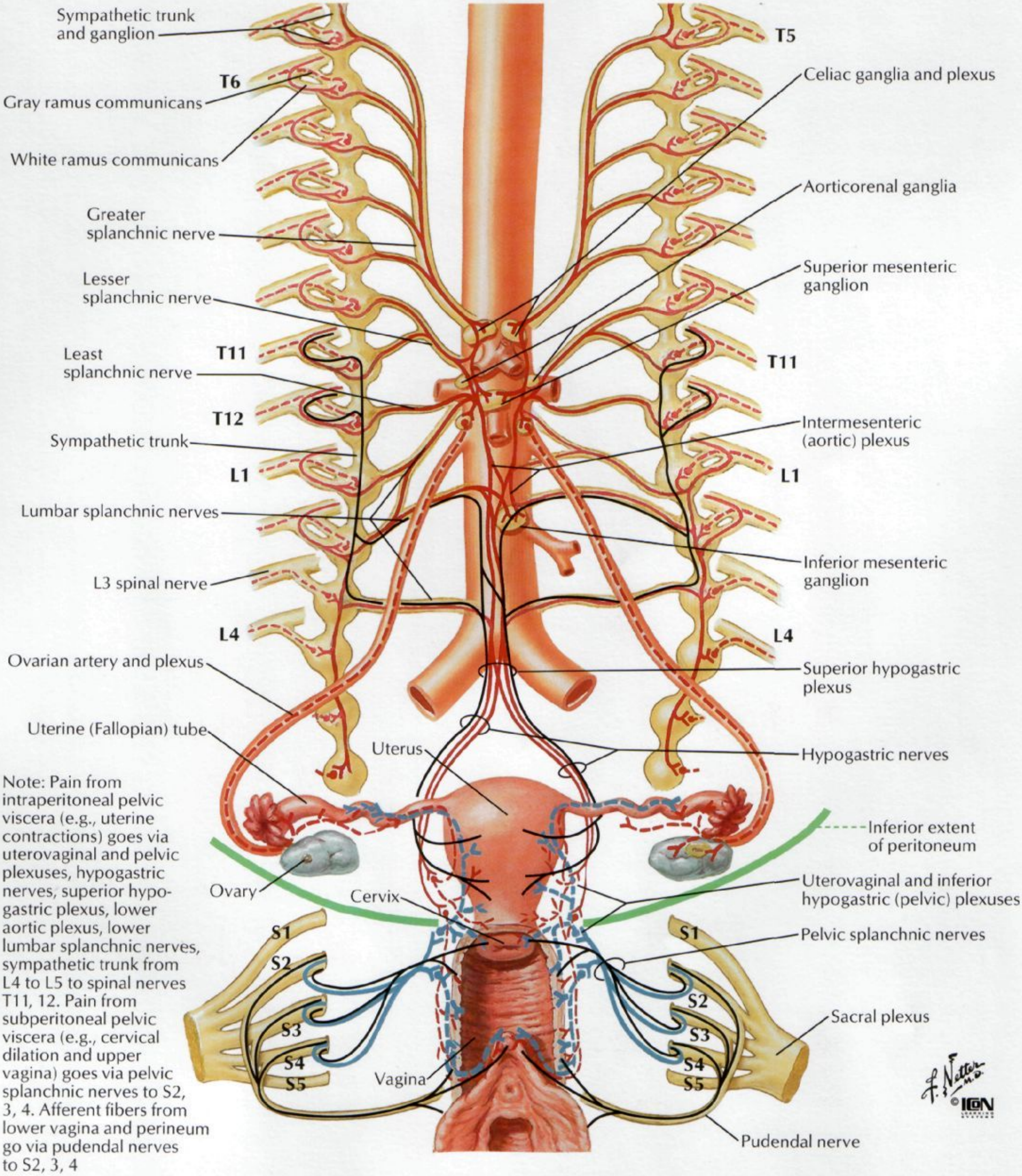
·········· Motor fibers to lower uterine segment, cervix and upper vagina (parasympathetic)

– – – – Sensory fibers from lower vagina and perineum accompany somatic fibers via pudendal nerve to S2, 3, 4

- - - - - - Motor fibers to lower vagina and perineum via pudendal nerve (somatic)

Innervation of Female Reproductive Organs: Schema

SEE ALSO PLATE 160



Note: Pain from intraperitoneal pelvic viscera (e.g., uterine contractions) goes via uterovaginal and pelvic plexuses, hypogastric nerves, superior hypogastric plexus, lower aortic plexus, lower lumbar splanchnic nerves, sympathetic trunk from L4 to L5 to spinal nerves T11, 12. Pain from subperitoneal pelvic viscera (e.g., cervical dilation and upper vagina) goes via pelvic splanchnic nerves to S2, 3, 4. Afferent fibers from lower vagina and perineum go via pudendal nerves to S2, 3, 4

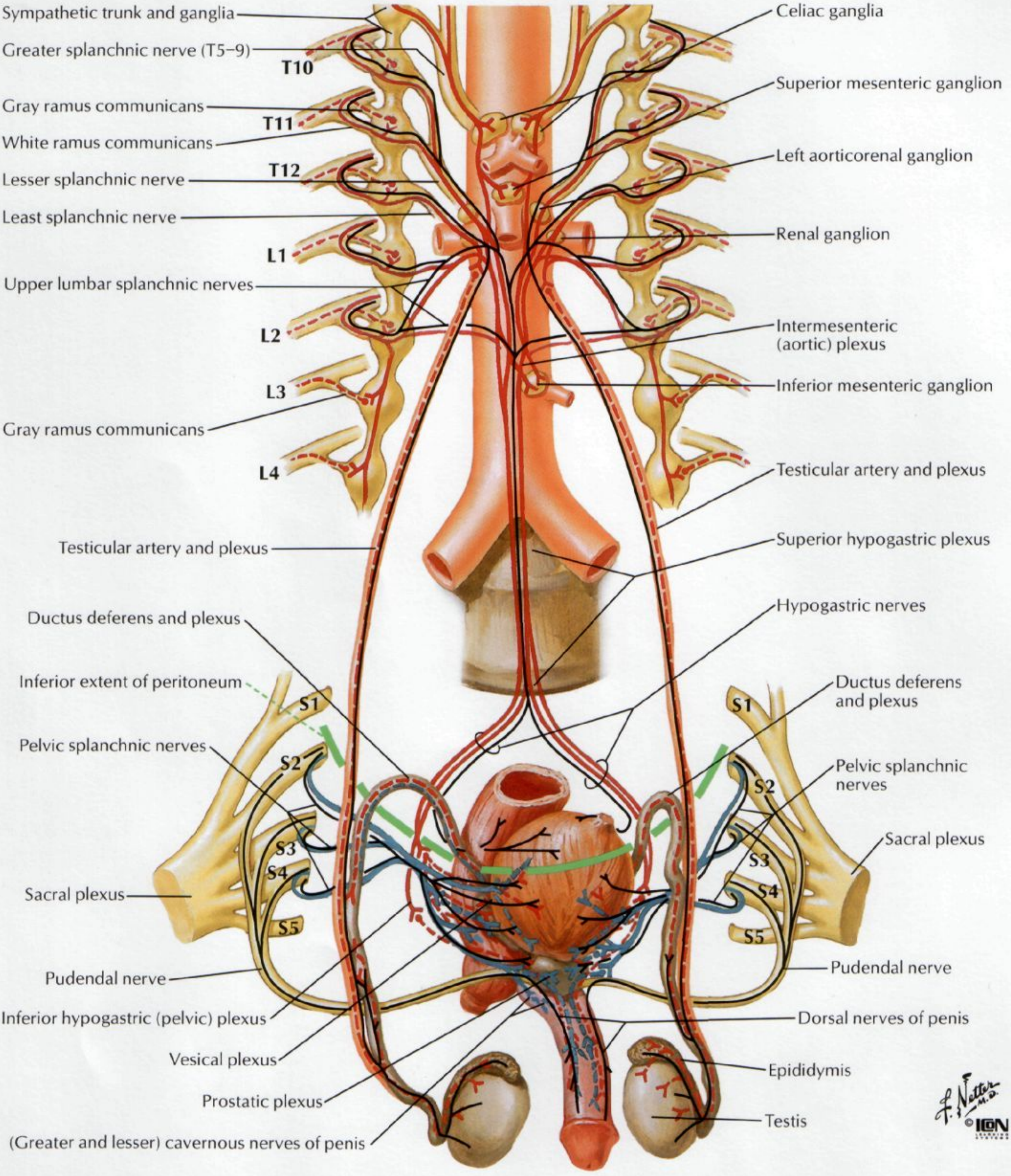
Sympathetic fibers { **Presynaptic** ——— **Postsynaptic** - - - - -

Parasympathetic fibers { **Presynaptic** ——— **Postsynaptic** - - - - -

Afferent fibers ———

Innervation of Male Reproductive Organs: Schema

SEE ALSO PLATE 160


Sympathetic trunk and ganglia
Greater splanchnic nerve (T5–9)
T10
Gray ramus communicans
T11
White ramus communicans
T12
Lesser splanchnic nerve
Least splanchnic nerve
L1
Upper lumbar splanchnic nerves
L2
L3
Gray ramus communicans
L4
Testicular artery and plexus
Ductus deferens and plexus
Inferior extent of peritoneum
S1
Pelvic splanchnic nerves
S2
S3
S4
Sacral plexus
S5
Pudendal nerve
Inferior hypogastric (pelvic) plexus
Vesical plexus
Prostatic plexus
(Greater and lesser) cavernous nerves of penis
Celiac ganglia
Superior mesenteric ganglion
Left aorticorenal ganglion
Renal ganglion
Intermesenteric (aortic) plexus
Inferior mesenteric ganglion
Testicular artery and plexus
Superior hypogastric plexus
Hypogastric nerves
Ductus deferens and plexus
S1
Pelvic splanchnic nerves
S2
Sacral plexus
S3
S4
S5
Pudendal nerve
Dorsal nerves of penis
Epididymis
Testis
F. Netter M.D.
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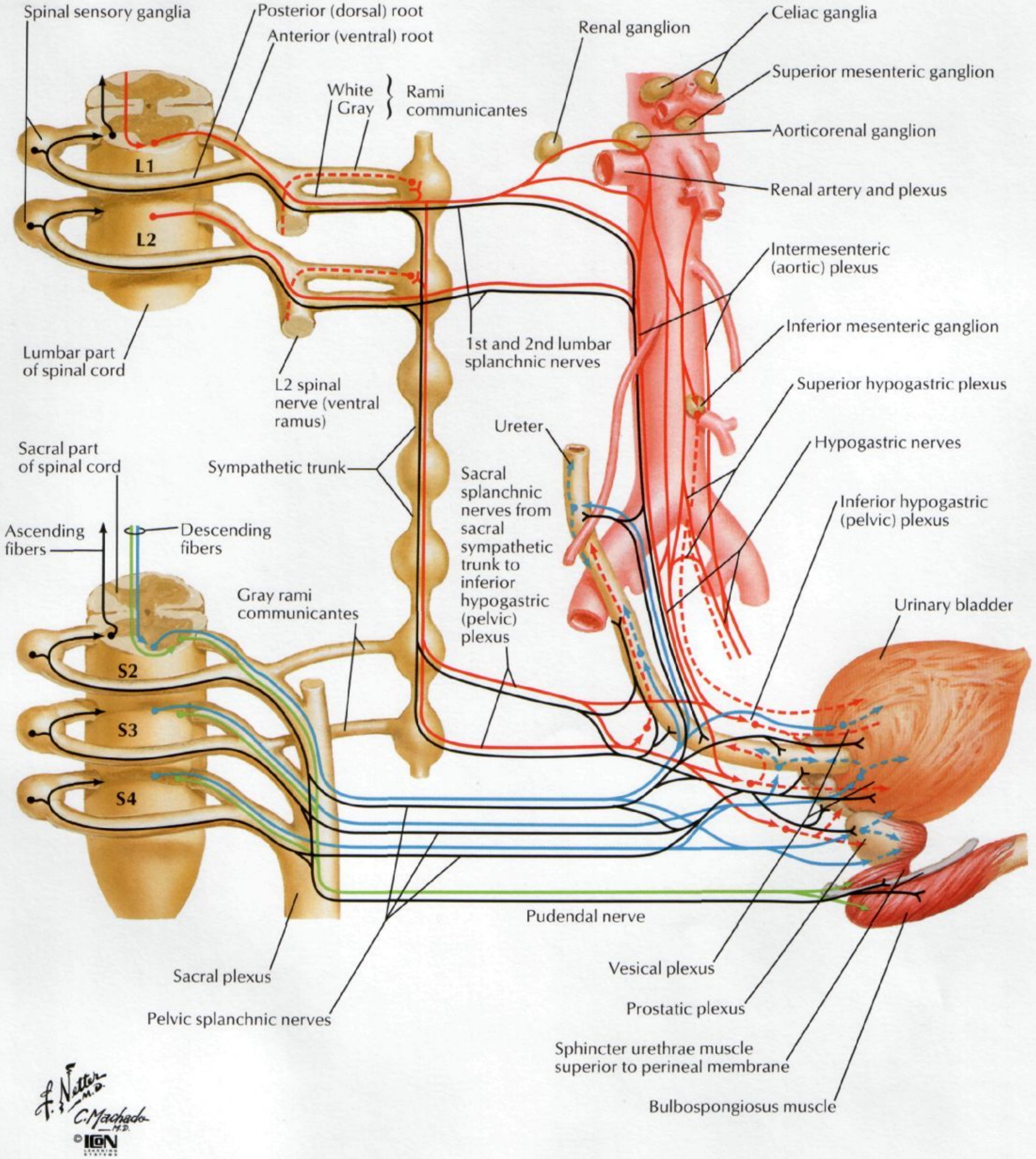
Sympathetic fibers { **Presynaptic** ——— / **Postsynaptic** - - - - -

Parasympathetic fibers { **Presynaptic** ——— / **Postsynaptic** - - - - -

Afferent fibers ———

Innervation of Urinary Bladder and Lower Ureter: Schema

SEE ALSO PLATE 160

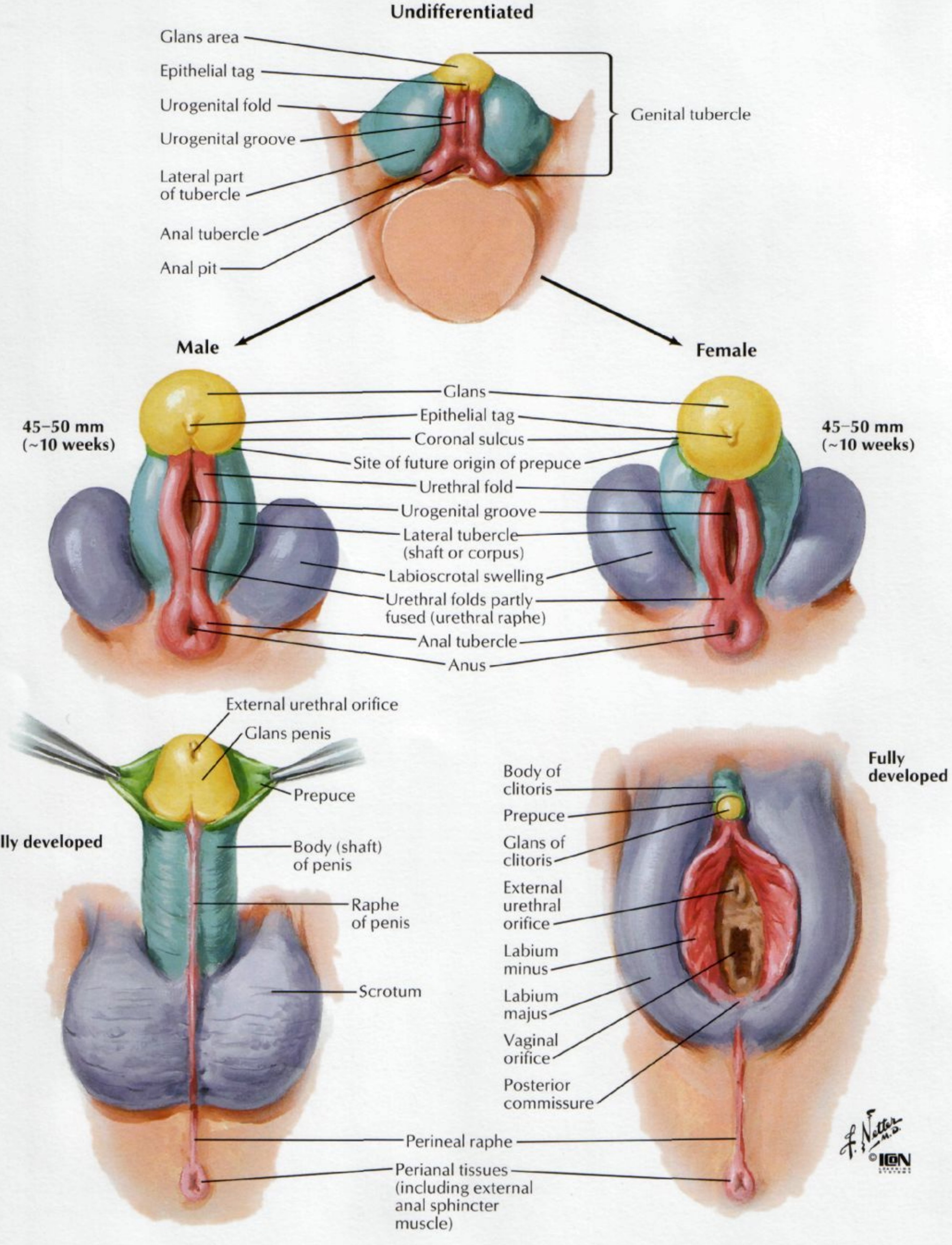


Sympathetic fibers { **Presynaptic** ——— **Postsynaptic** - - - - -

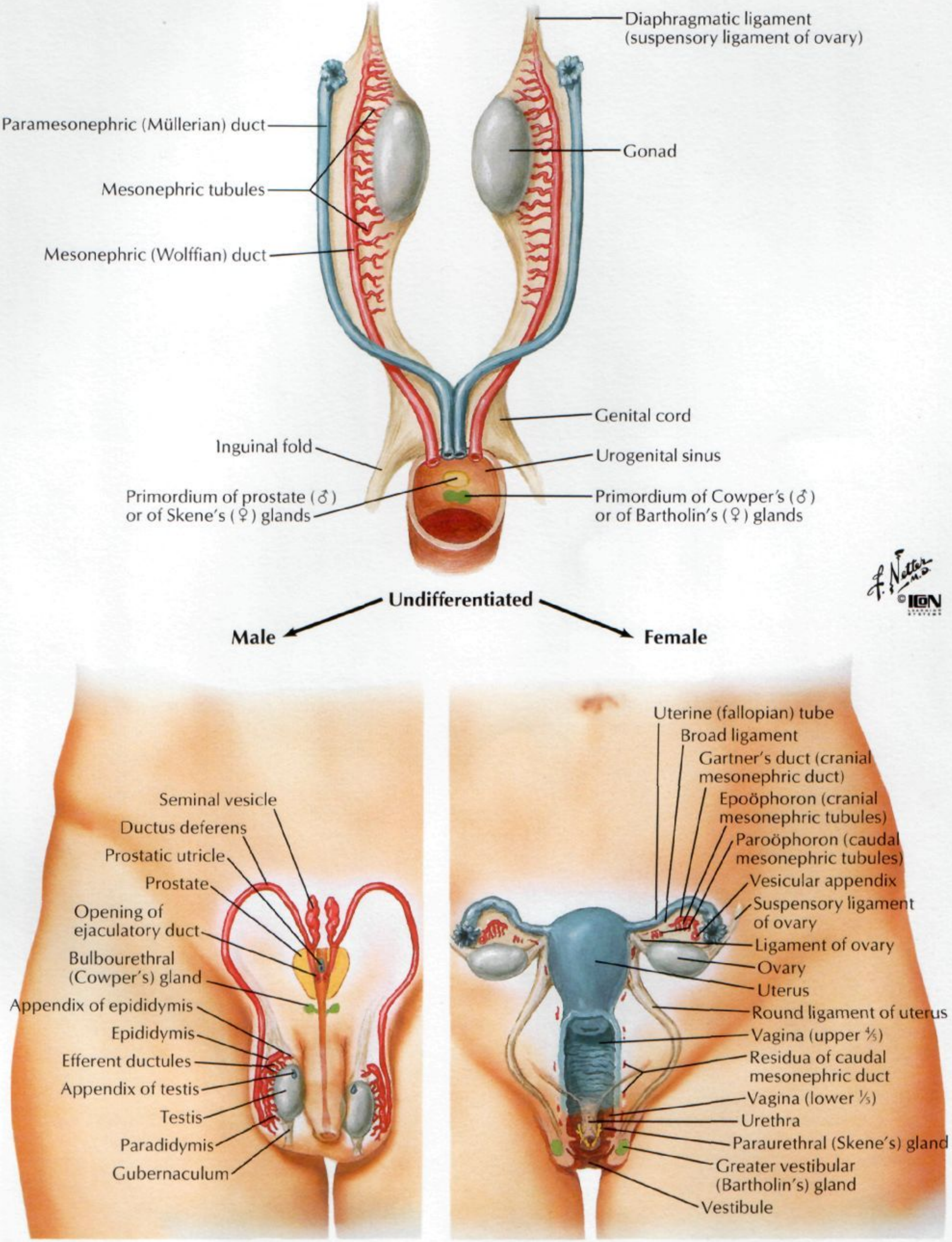
Parasympathetic fibers { **Presynaptic** ——— **Postsynaptic** - - - - -

Somatic efferent fibers ———
Afferent fibers ———

Homologues of External Genitalia

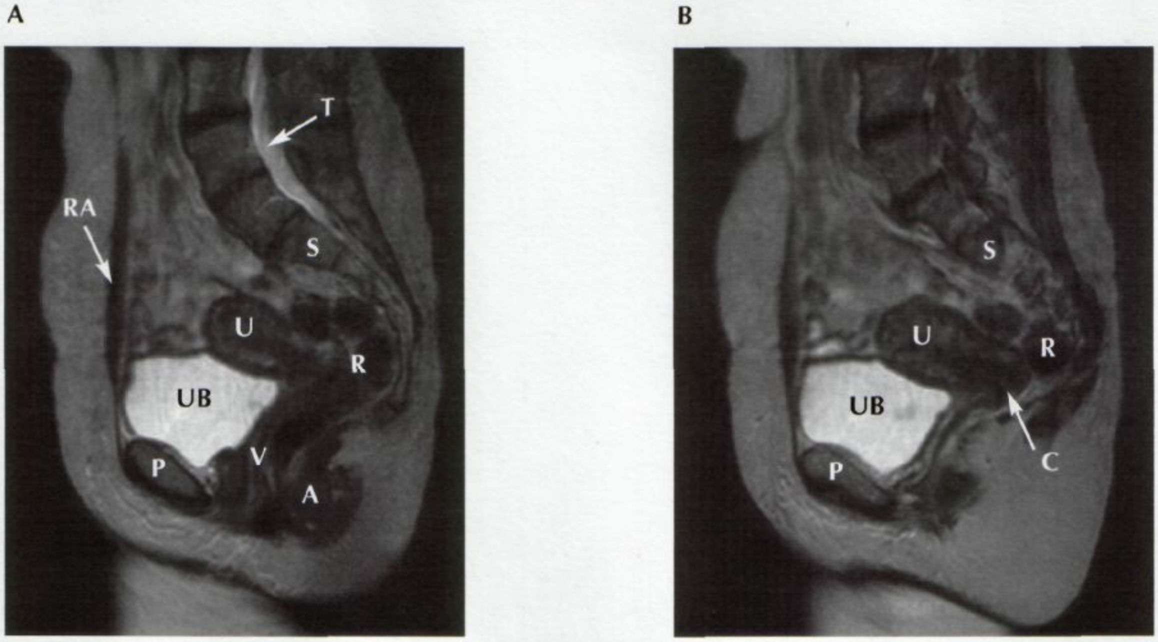


Homologues of Internal Genitalia



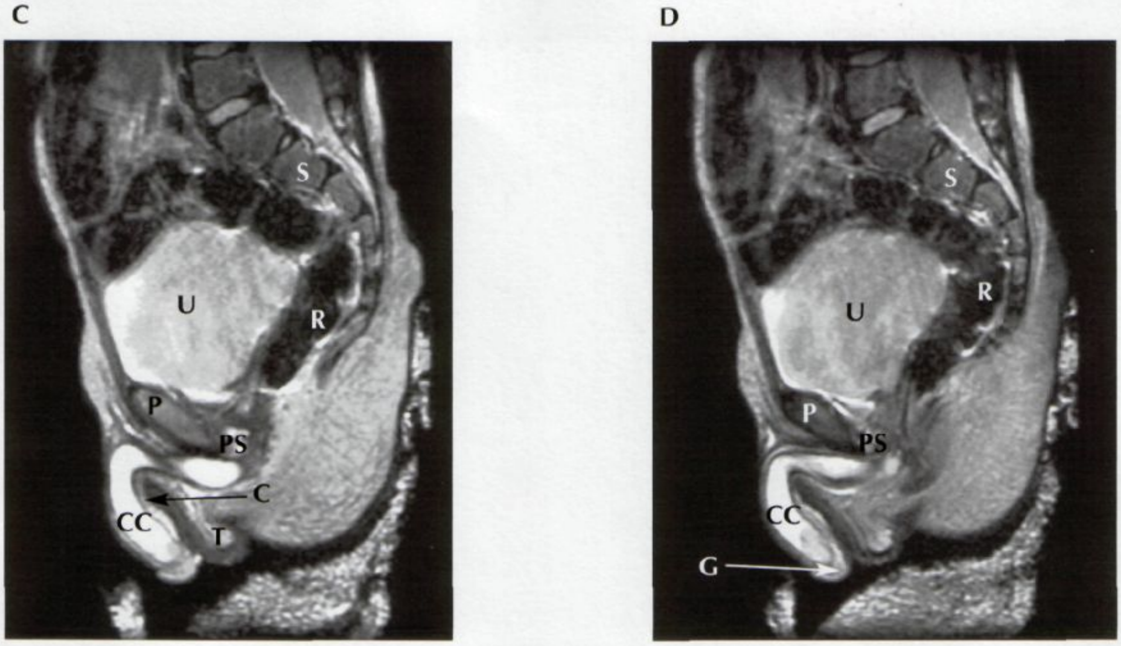
Pelvic Scans: Sagittal MR Images

Median (A) and paramedian (B) sagittal MR images of female pelvis



A	Anal canal	**S**	Sacrum
C	External os of cervix	**T**	Thecal sac
P	Pubic symphysis	**U**	Uterus
R	Rectum	**UB**	Urinary bladder
RA	Rectus abdominis muscle	**V**	Vagina

Median (C) and paramedian (D) sagittal MR images of male pelvis



C	Corpus spongiosum	**R**	Rectum
CC	Corpus cavernosum	**S**	Sacrum
G	Glans of penis	**T**	Testis
P	Pubic symphysis	**U**	Urinary bladder
PS	Prostate		

Section VI
UPPER LIMB

SURFACE ANATOMY
Plate 401

401. Upper Limb

SHOULDER AND AXILLA
Plates 402–413

402. Clavicle and Sternoclavicular Joint
403. Humerus and Scapula: Anterior Views
404. Humerus and Scapula: Posterior Views
405. Shoulder: Anteroposterior Radiograph
406. Shoulder (Glenohumeral) Joint
407. Muscles of Shoulder
408. Muscles of Rotator Cuff
409. Scapulohumeral Dissection
410. Axillary Artery and Anastomoses Around Scapula
411. Pectoral, Clavipectoral and Axillary Fasciae
412. Axilla (Dissection): Anterior View
413. Brachial Plexus: Schema

ARM
Plates 414–418

414. Muscles of Arm: Anterior Views
415. Muscles of Arm: Posterior Views
416. Brachial Artery In Situ
417. Brachial Artery and Anastomoses Around Elbow
418. Arm: Serial Cross Sections

ELBOW AND FOREARM
Plates 419–434

419. Bones of Elbow
420. Elbow: Radiographs
421. Ligaments of Elbow
422. Bones of Forearm
423. Individual Muscles of Forearm: Rotators of Radius
424. Individual Muscles of Forearm: Extensors of Wrist and Digits
425. Individual Muscles of Forearm: Flexors of Wrist

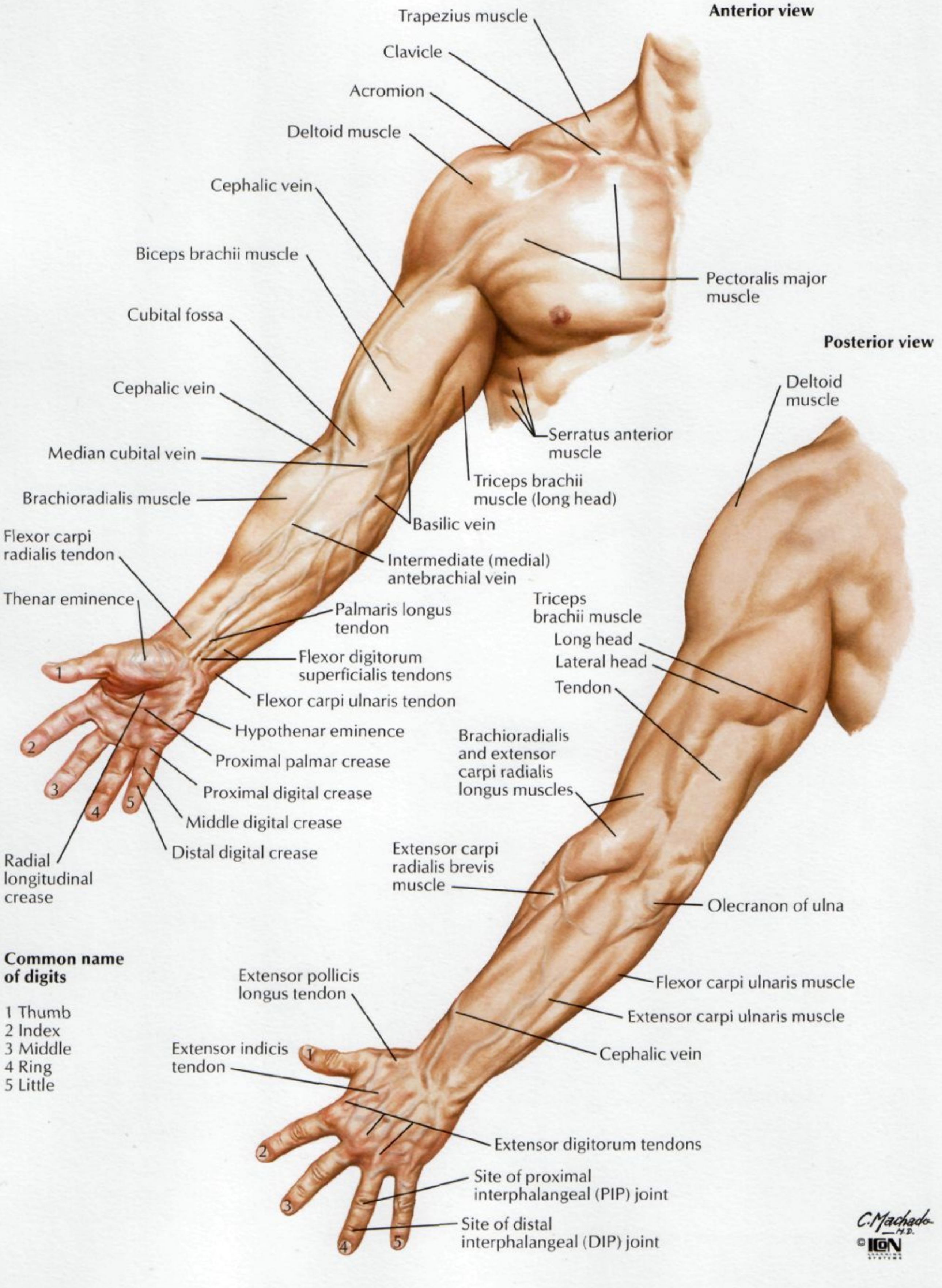
426. Individual Muscles of Forearm: Flexors of Digits
427. Muscles of Forearm (Superficial Layer): Posterior View
428. Muscles of Forearm (Deep Layer): Posterior View
429. Muscles of Forearm (Superficial Layer): Anterior View
430. Muscles of Forearm (Intermediate Layer): Anterior View
431. Muscles of Forearm (Deep Layer): Anterior View
432. Forearm: Serial Cross Sections
433. Attachments of Muscles of Forearm: Anterior View
434. Attachments of Muscles of Forearm: Posterior View

WRIST AND HAND
Plates 435–454

435. Carpal Bones
436. Movements of Wrist
437. Ligaments of Wrist
438. Ligaments of Wrist (*continued*)
439. Bones of Wrist and Hand
440. Wrist and Hand: Anteroposterior Radiograph
441. Metacarpophalangeal and Interphalangeal Ligaments
442. Wrist and Hand: Superficial Palmar Dissections
443. Wrist and Hand: Deeper Palmar Dissections
444. Flexor Tendons, Arteries and Nerves at Wrist
445. Bursae, Spaces and Tendon Sheaths of Hand
446. Lumbrical Muscles and Bursae, Spaces and Sheaths: Schema
447. Flexor and Extensor Tendons in Fingers
448. Intrinsic Muscles of Hand
449. Arteries and Nerves of Hand: Palmar Views
450. Wrist and Hand: Superficial Radial Dissection
451. Wrist and Hand: Superficial Dorsal Dissection
452. Wrist and Hand: Deep Dorsal Dissection
453. Extensor Tendons at Wrist
454. Fingers

NEUROVASCULATURE
Plates 455–466

455. Cutaneous Innervation of Wrist and Hand
456. Arteries and Nerves of Upper Limb
457. Musculocutaneous Nerve
458. Median Nerve
459. Ulnar Nerve
460. Radial Nerve in Arm and Nerves of Posterior Shoulder
461. Radial Nerve in Forearm
462. Cutaneous Nerves and Superficial Veins of Shoulder and Arm
463. Cutaneous Nerves and Superficial Veins of Forearm
464. Cutaneous Innervation of Upper Limb
465. Dermatomes of Upper Limb
466. Lymph Vessels and Nodes of Upper Limb

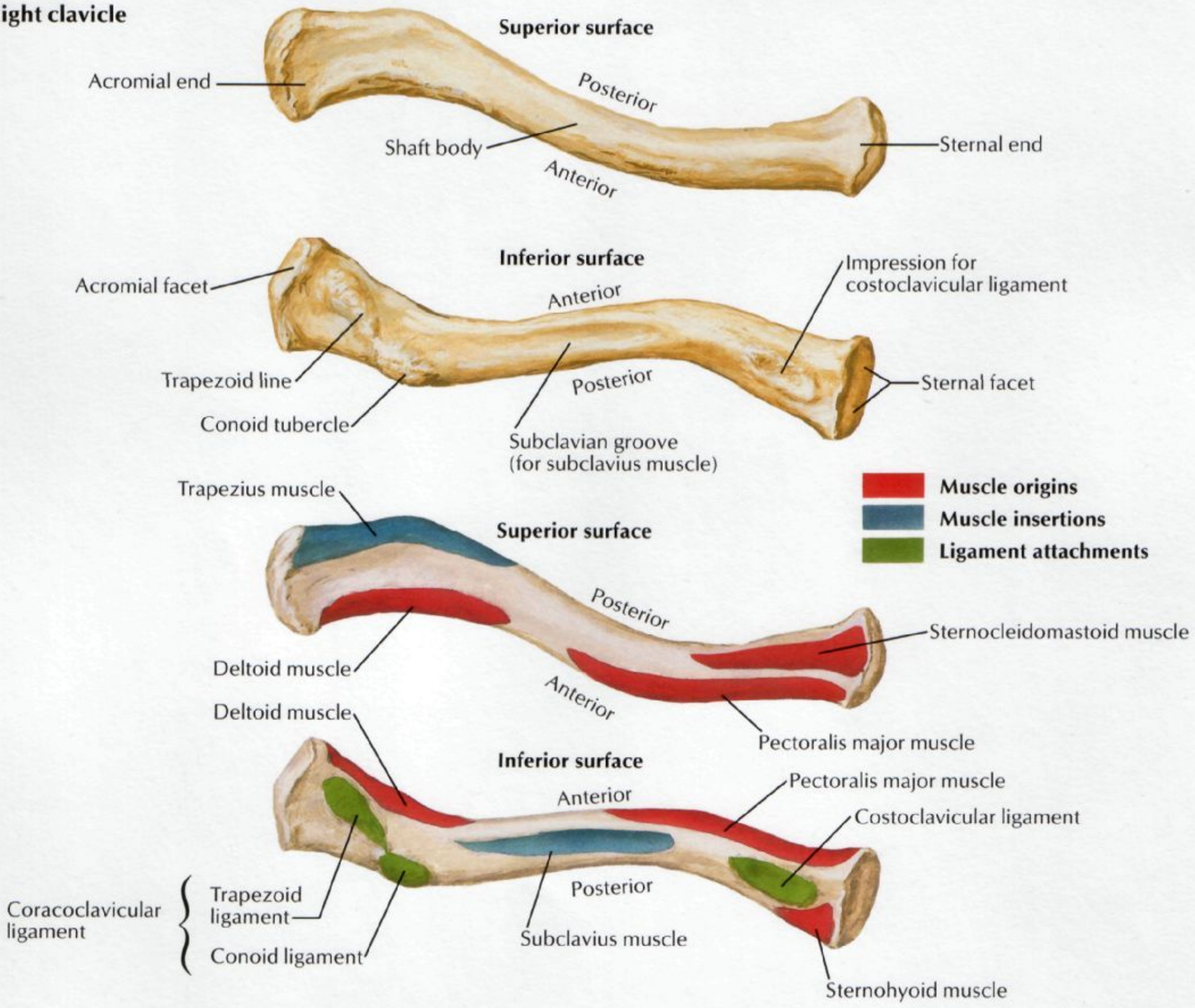


Common name of digits

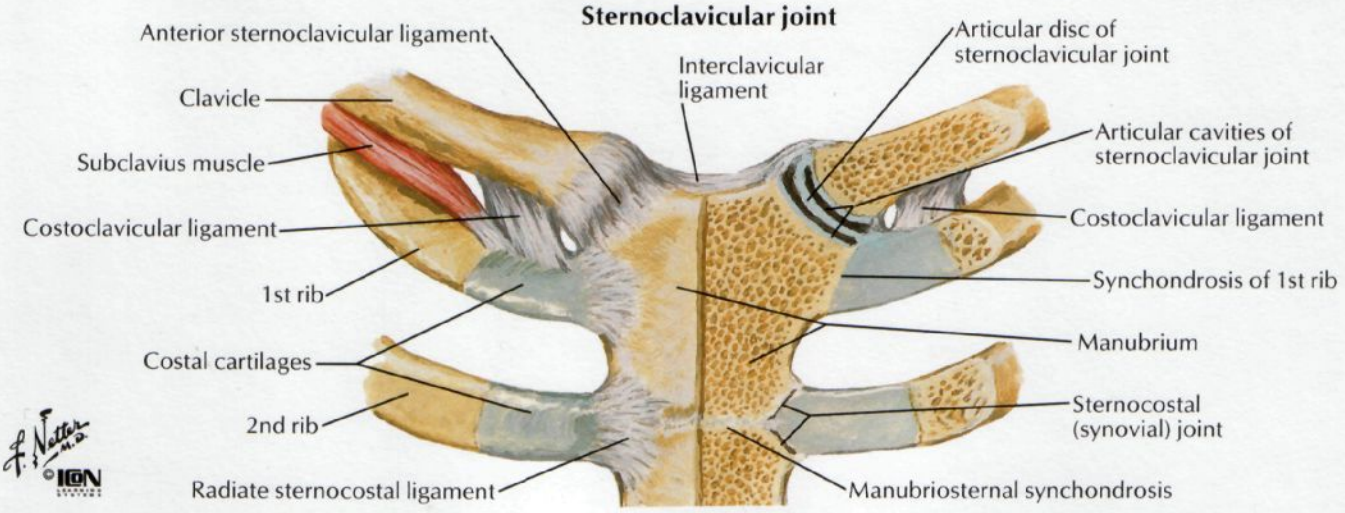
1 Thumb
2 Index
3 Middle
4 Ring
5 Little

Clavicle and Sternoclavicular Joint

Right clavicle



Sternoclavicular joint


Anterior sternoclavicular ligament
Interclavicular ligament
Articular disc of sternoclavicular joint
Clavicle
Articular cavities of sternoclavicular joint
Subclavius muscle
Costoclavicular ligament
Costoclavicular ligament
Synchondrosis of 1st rib
1st rib
Manubrium
Costal cartilages
Sternocostal (synovial) joint
2nd rib
Radiate sternocostal ligament
Manubriosternal synchondrosis
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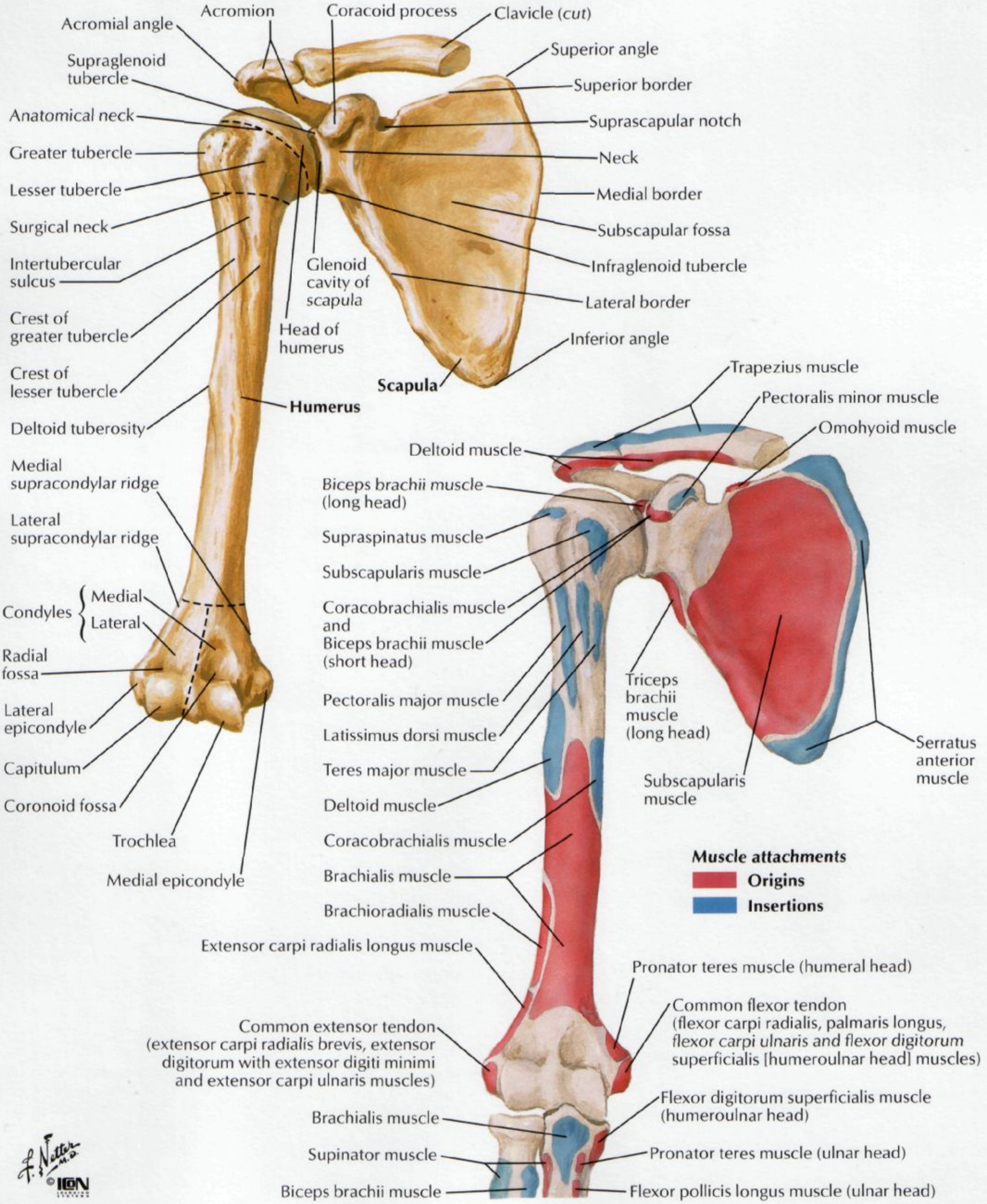
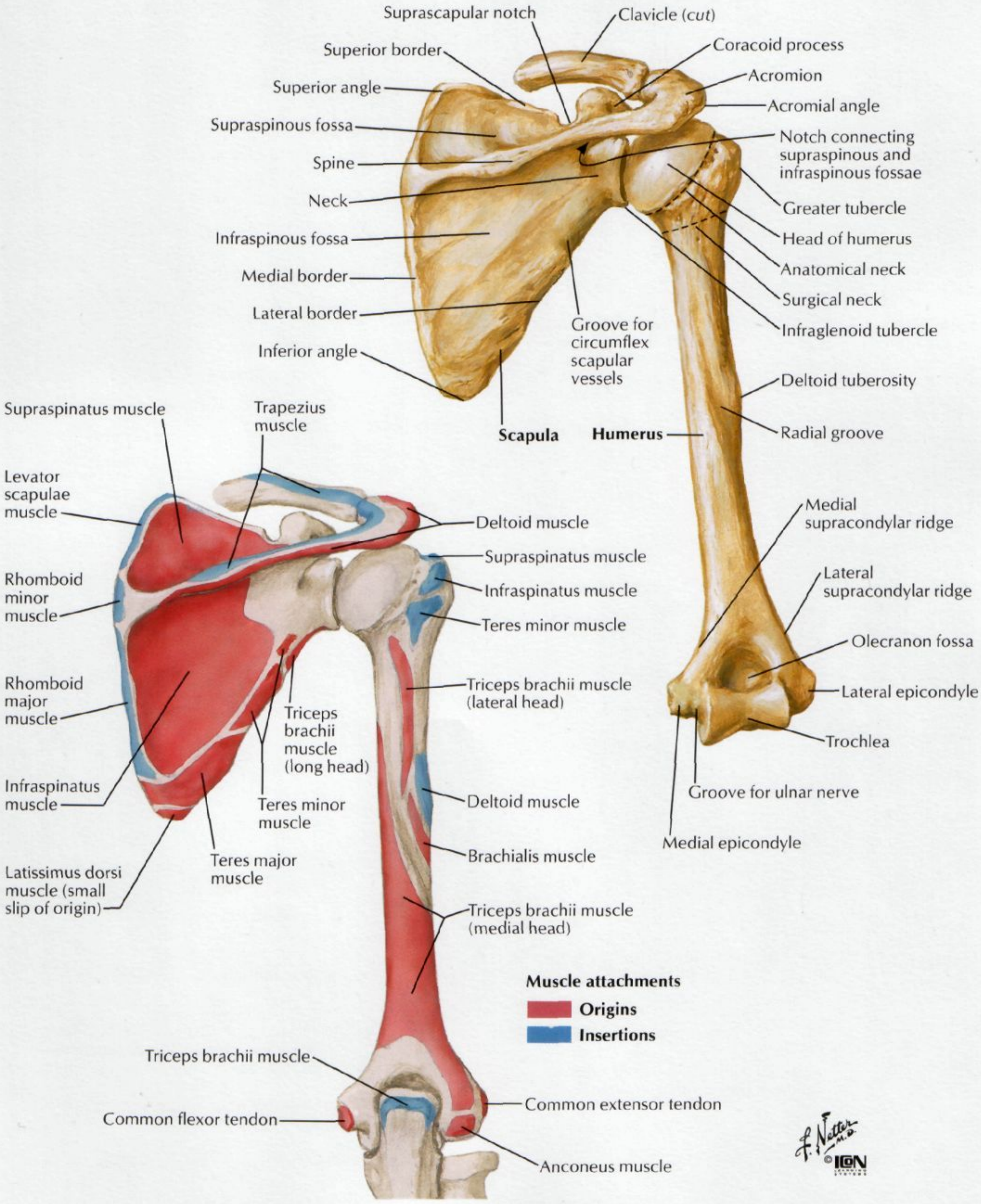
Humerus and Scapula: Anterior Views

SEE ALSO PLATE 178



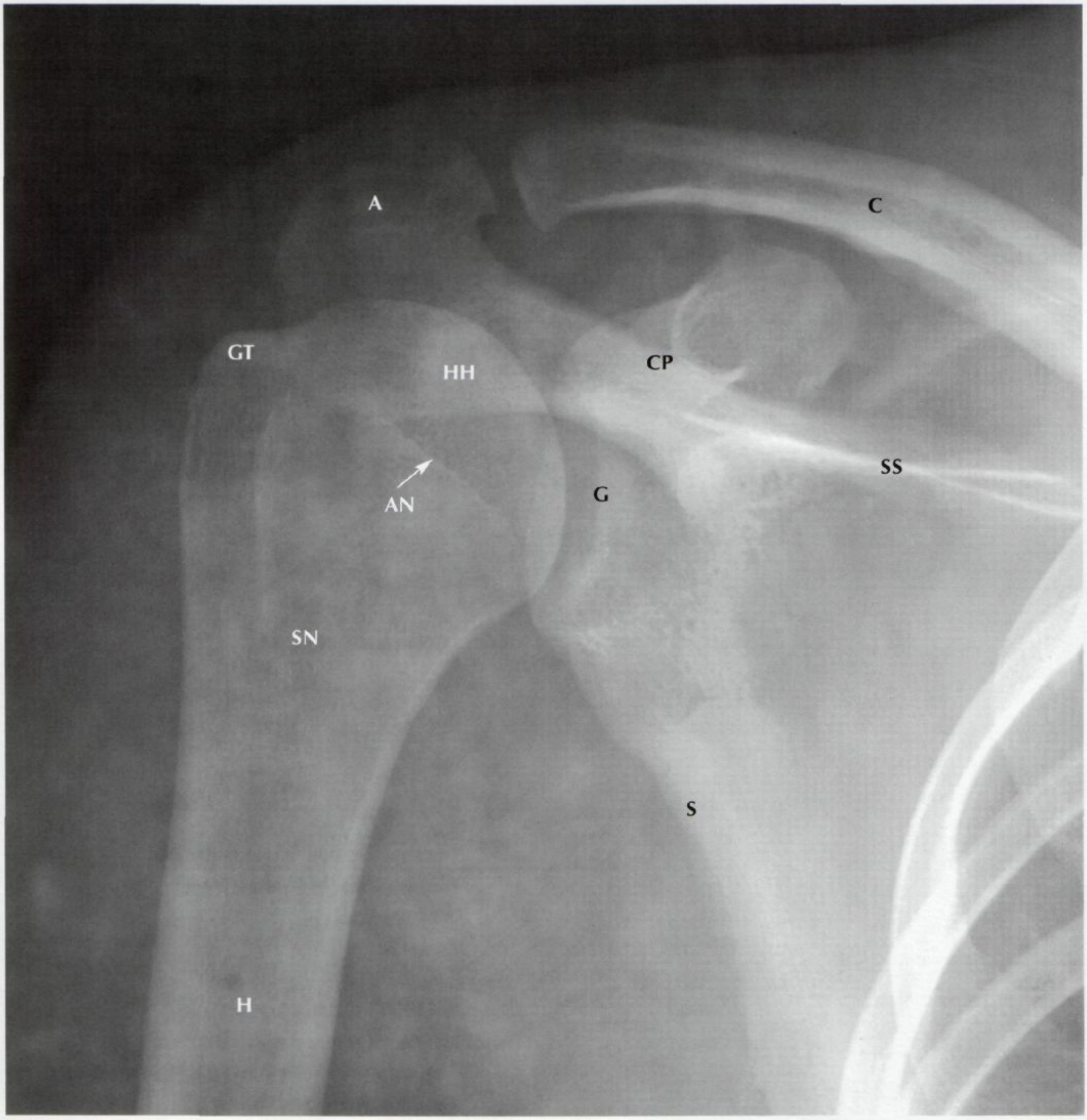
Humerus and Scapula: Posterior Views

SEE ALSO PLATE 178



Shoulder: Anteroposterior Radiograph

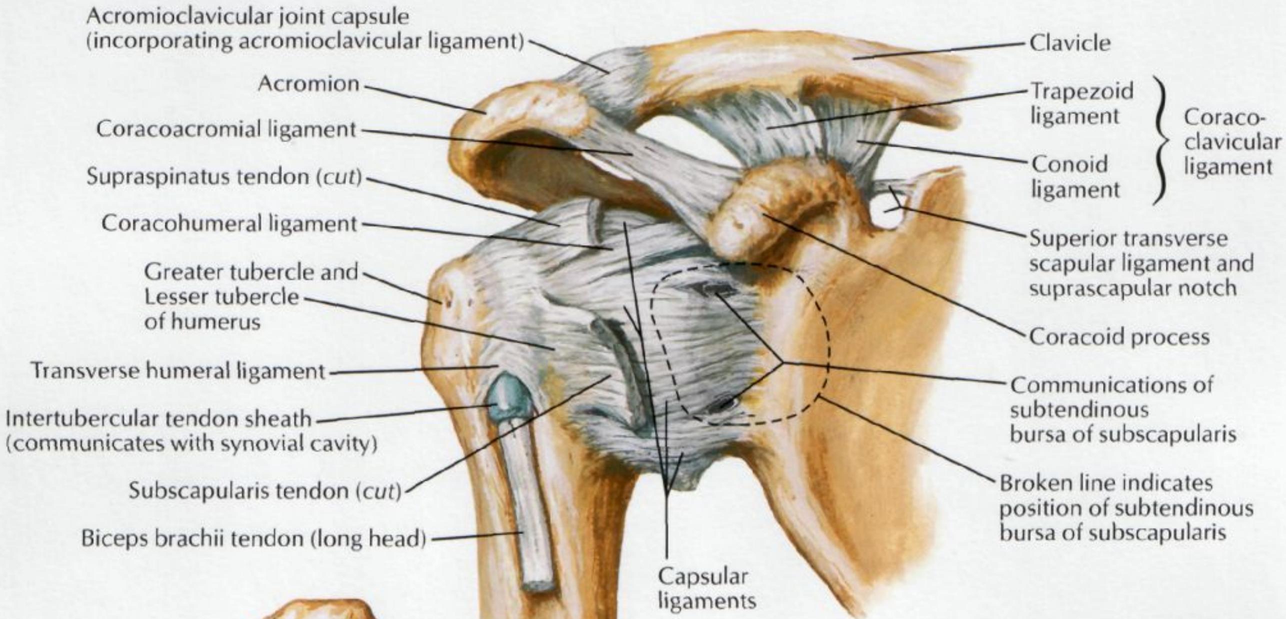
SEE ALSO PLATE 403



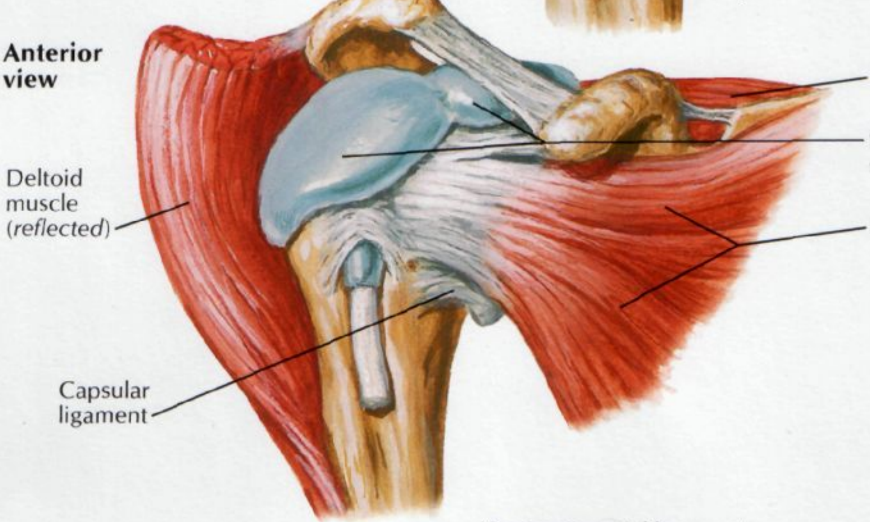
A	Acromion
AN	Anatomical neck of humerus
C	Clavicle
CP	Coracoid process
G	Glenoid cavity of scapula
GT	Greater tubercle
H	Humerus
HH	Head of humerus
S	Scapula (lateral border)
SN	Surgical neck of humerus
SS	Spine of scapula

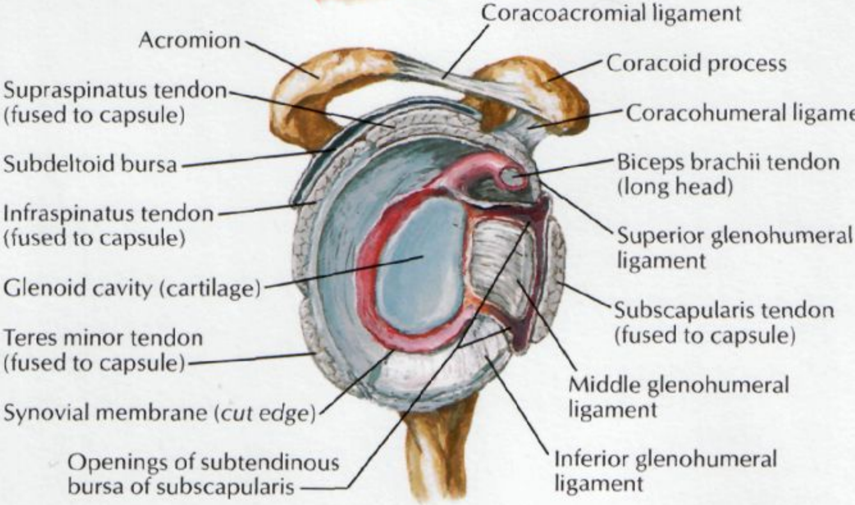
Shoulder (Glenohumeral) Joint

Anterior view

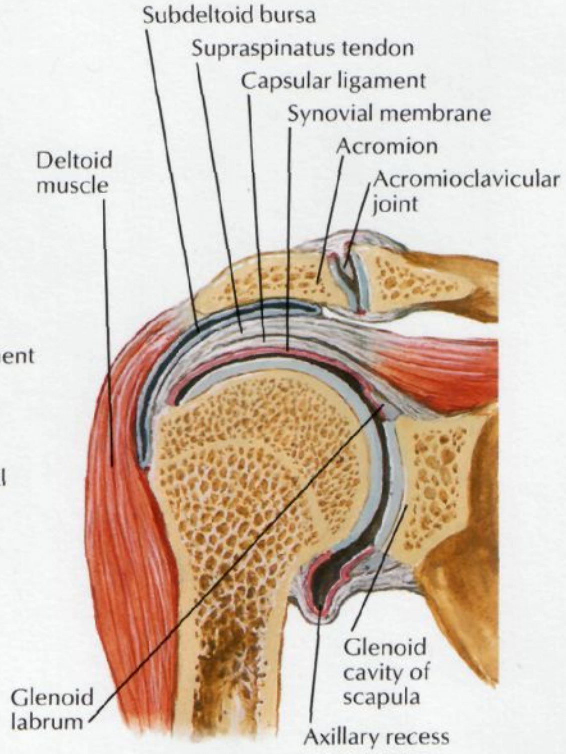

Acromioclavicular joint capsule (incorporating acromioclavicular ligament)
Acromion
Coracoacromial ligament
Supraspinatus tendon (*cut*)
Coracohumeral ligament
Greater tubercle and
Lesser tubercle
of humerus
Transverse humeral ligament
Intertubercular tendon sheath (communicates with synovial cavity)
Subscapularis tendon (*cut*)
Biceps brachii tendon (long head)
Capsular ligaments
Clavicle
Trapezoid ligament
Conoid ligament
Coraco-clavicular ligament
Superior transverse scapular ligament and suprascapular notch
Coracoid process
Communications of subtendinous bursa of subscapularis
Broken line indicates position of subtendinous bursa of subscapularis

Anterior view


Deltoid muscle (*reflected*)
Capsular ligament
Supraspinatus muscle
Subdeltoid bursa fused with subacromial bursa
Subscapularis muscle


Acromion
Supraspinatus tendon (fused to capsule)
Subdeltoid bursa
Infraspinatus tendon (fused to capsule)
Glenoid cavity (cartilage)
Teres minor tendon (fused to capsule)
Synovial membrane (*cut edge*)
Openings of subtendinous bursa of subscapularis
Coracoacromial ligament
Coracoid process
Coracohumeral ligament
Biceps brachii tendon (long head)
Superior glenohumeral ligament
Subscapularis tendon (fused to capsule)
Middle glenohumeral ligament
Inferior glenohumeral ligament

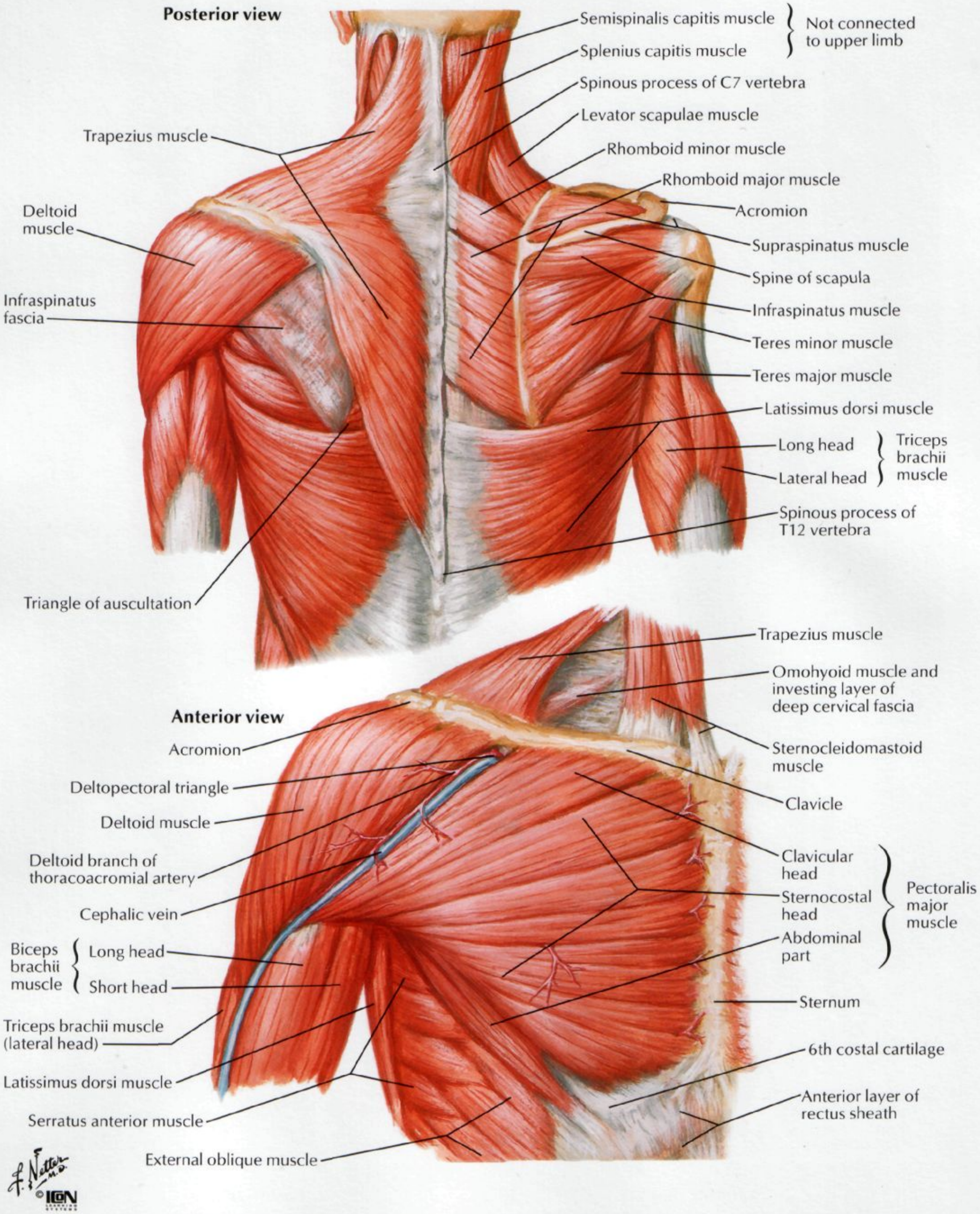
Joint opened: lateral view



Coronal section through joint

Muscles of Shoulder

SEE ALSO PLATES 23, 167, 182, 183, 185, 186



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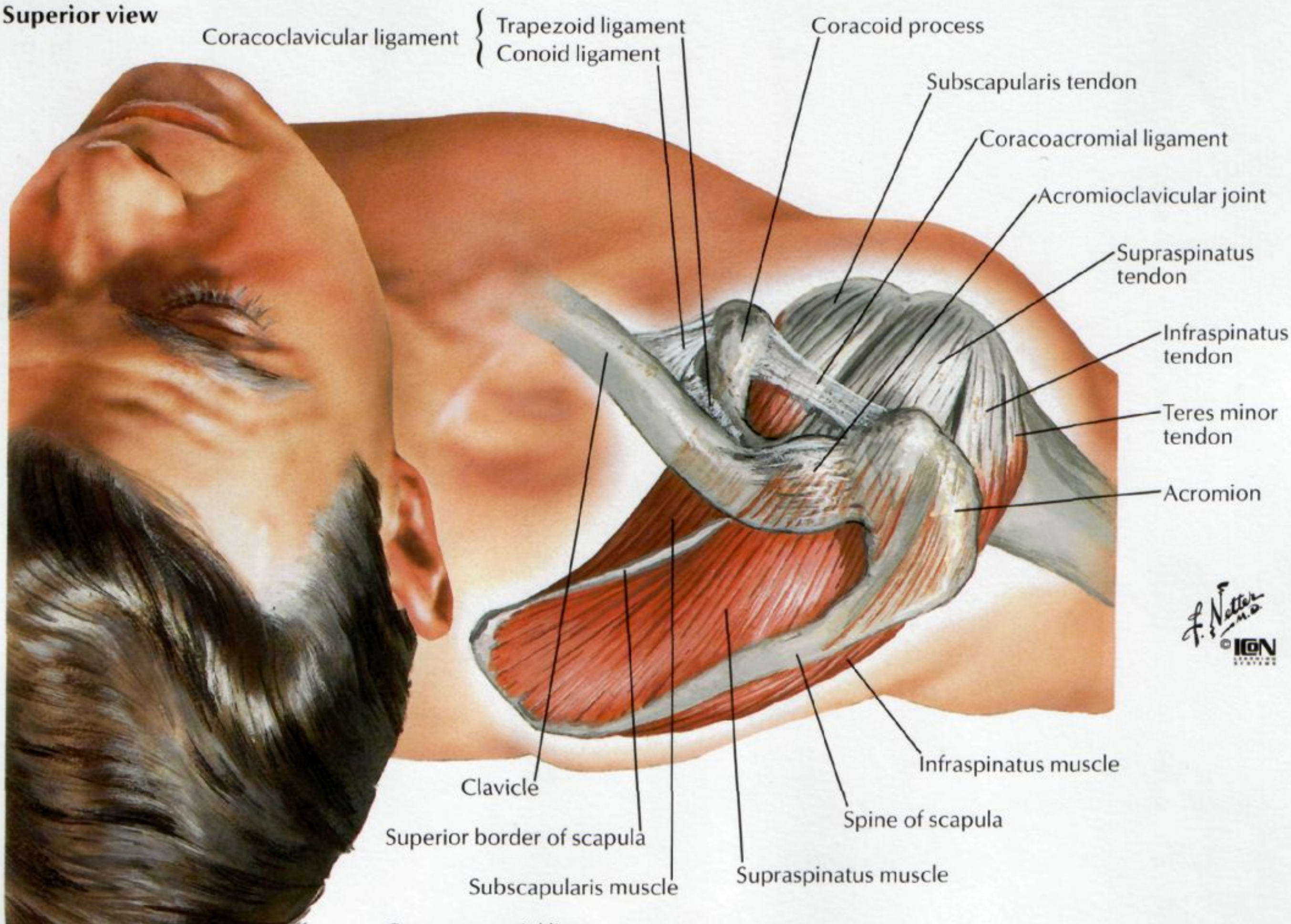
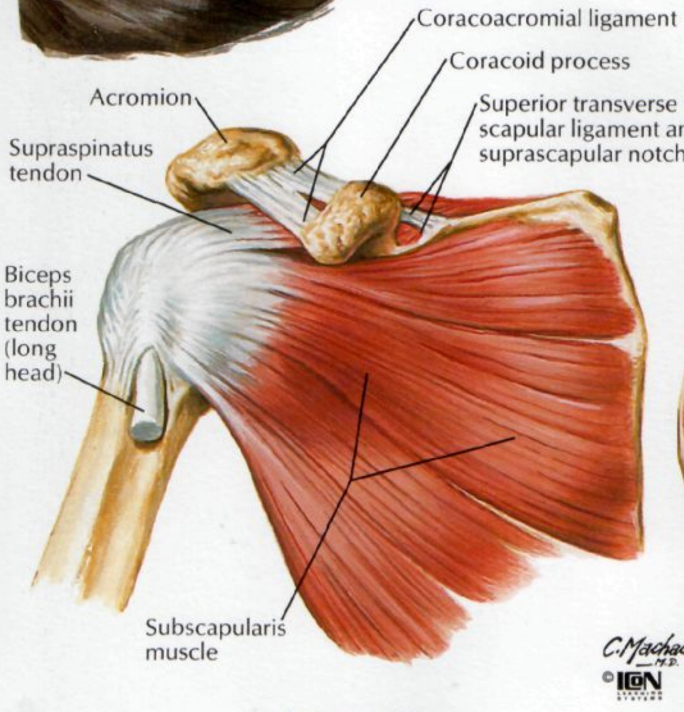
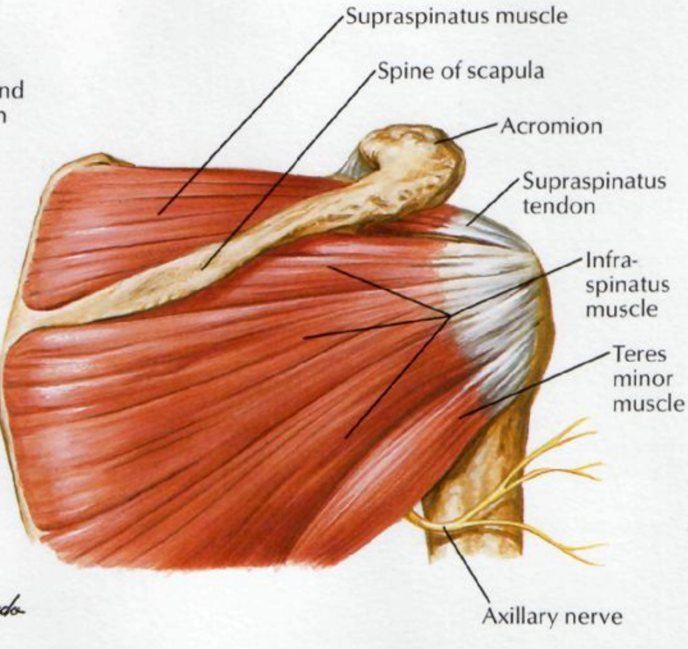
Muscles of Rotator Cuff

Superior view




Coracoacromial ligament
Coracoid process
Acromion
Superior transverse scapular ligament and suprascapular notch
Supraspinatus tendon
Biceps brachii tendon (long head)
Subscapularis muscle

Anterior view

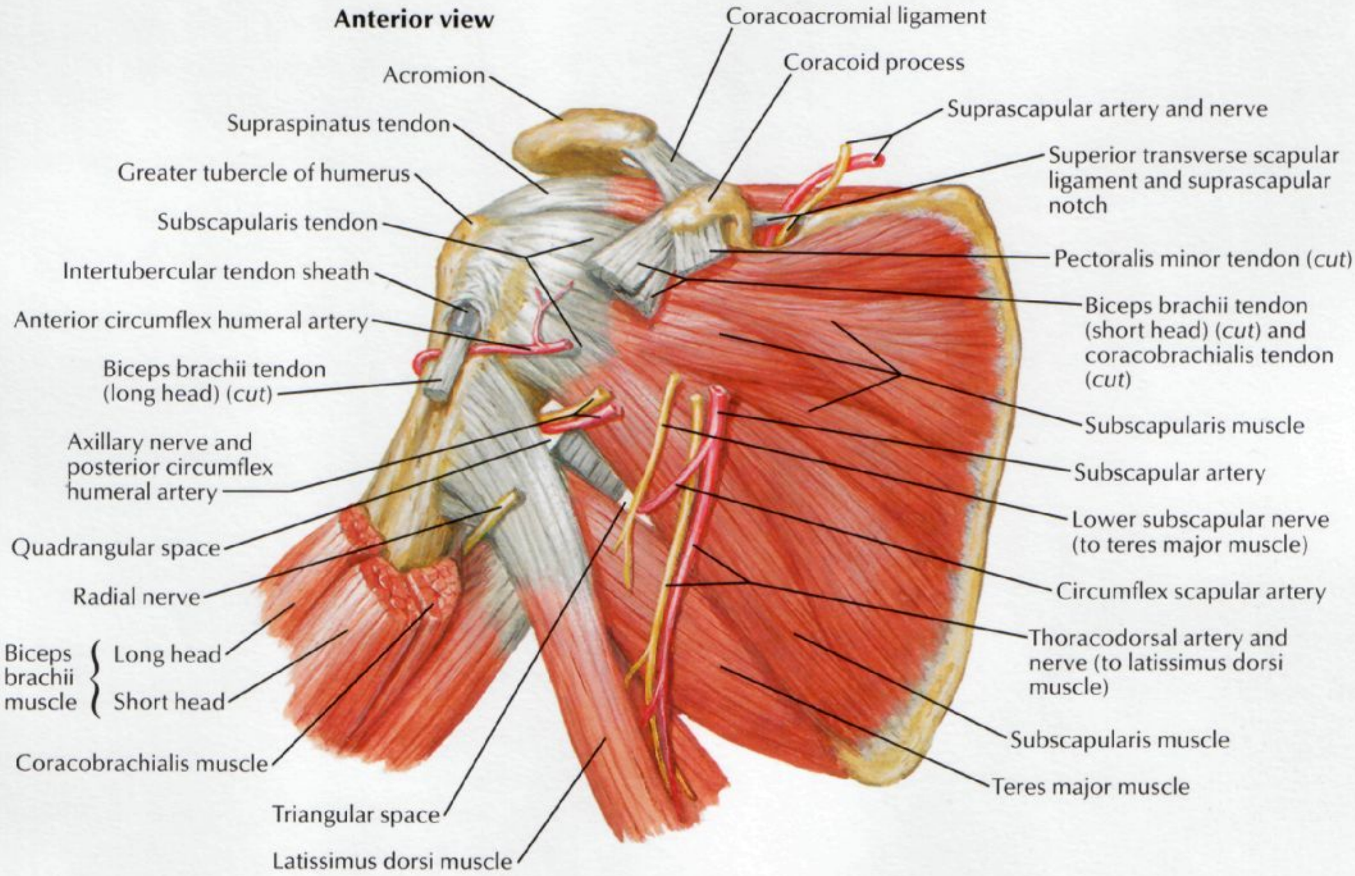


Posterior view

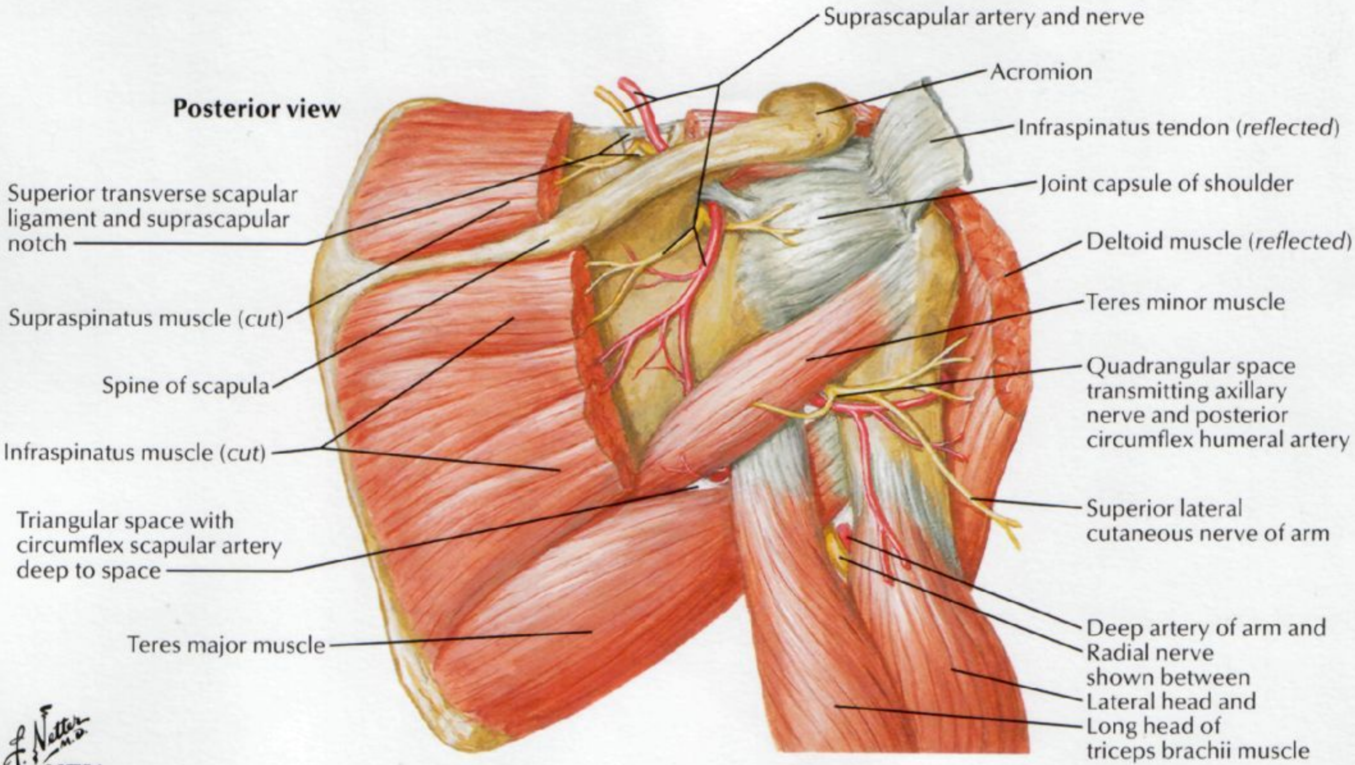
Scapulohumeral Dissection

SEE ALSO PLATE 460

Anterior view


Coracoacromial ligament
Coracoid process
Suprascapular artery and nerve
Superior transverse scapular ligament and suprascapular notch
Pectoralis minor tendon (*cut*)
Biceps brachii tendon (short head) (*cut*) and coracobrachialis tendon (*cut*)
Subscapularis muscle
Subscapular artery
Lower subscapular nerve (to teres major muscle)
Circumflex scapular artery
Thoracodorsal artery and nerve (to latissimus dorsi muscle)
Subscapularis muscle
Teres major muscle
Acromion
Supraspinatus tendon
Greater tubercle of humerus
Subscapularis tendon
Intertubercular tendon sheath
Anterior circumflex humeral artery
Biceps brachii tendon (long head) (*cut*)
Axillary nerve and posterior circumflex humeral artery
Quadrangular space
Radial nerve
Biceps brachii muscle { Long head
Short head
Coracobrachialis muscle
Triangular space
Latissimus dorsi muscle

Posterior view


Suprascapular artery and nerve
Acromion
Infraspinatus tendon (*reflected*)
Joint capsule of shoulder
Deltoid muscle (*reflected*)
Teres minor muscle
Quadrangular space transmitting axillary nerve and posterior circumflex humeral artery
Superior lateral cutaneous nerve of arm
Deep artery of arm and
Radial nerve
shown between
Lateral head and
Long head of
triceps brachii muscle
Superior transverse scapular ligament and suprascapular notch
Supraspinatus muscle (*cut*)
Spine of scapula
Infraspinatus muscle (*cut*)
Triangular space with circumflex scapular artery deep to space
Teres major muscle

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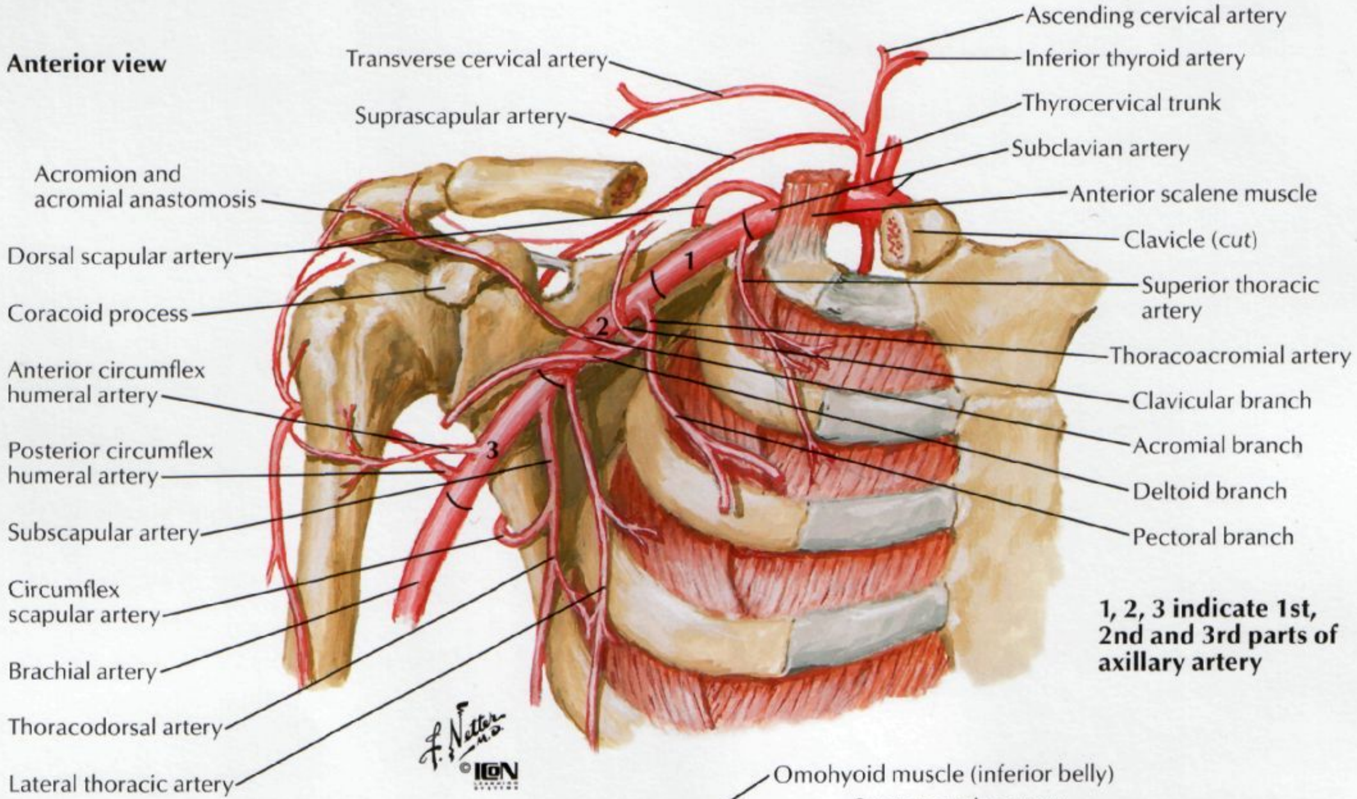
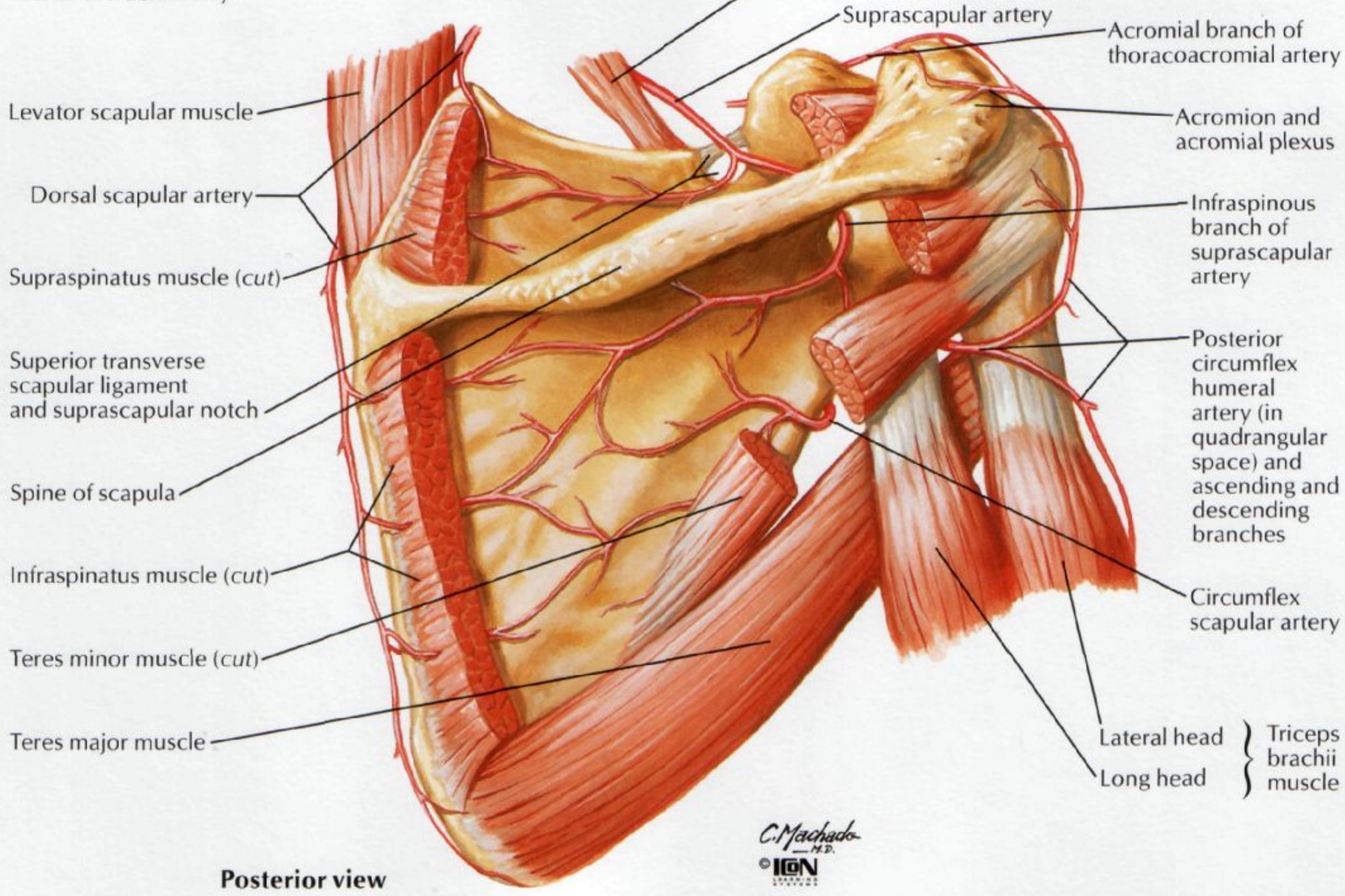
Axillary Artery and Anastomoses Around Scapula

SEE ALSO PLATES 29, 417

Anterior view



1, 2, 3 indicate 1st, 2nd and 3rd parts of axillary artery


Omohyoid muscle (inferior belly)
Suprascapular artery
Acromial branch of thoracoacromial artery
Levator scapular muscle
Acromion and acromial plexus
Dorsal scapular artery
Infraspinous branch of suprascapular artery
Supraspinatus muscle (*cut*)
Posterior circumflex humeral artery (in quadrangular space) and ascending and descending branches
Superior transverse scapular ligament and suprascapular notch
Spine of scapula
Circumflex scapular artery
Infraspinatus muscle (*cut*)
Teres minor muscle (*cut*)
Teres major muscle
Lateral head
Long head
Triceps brachii muscle
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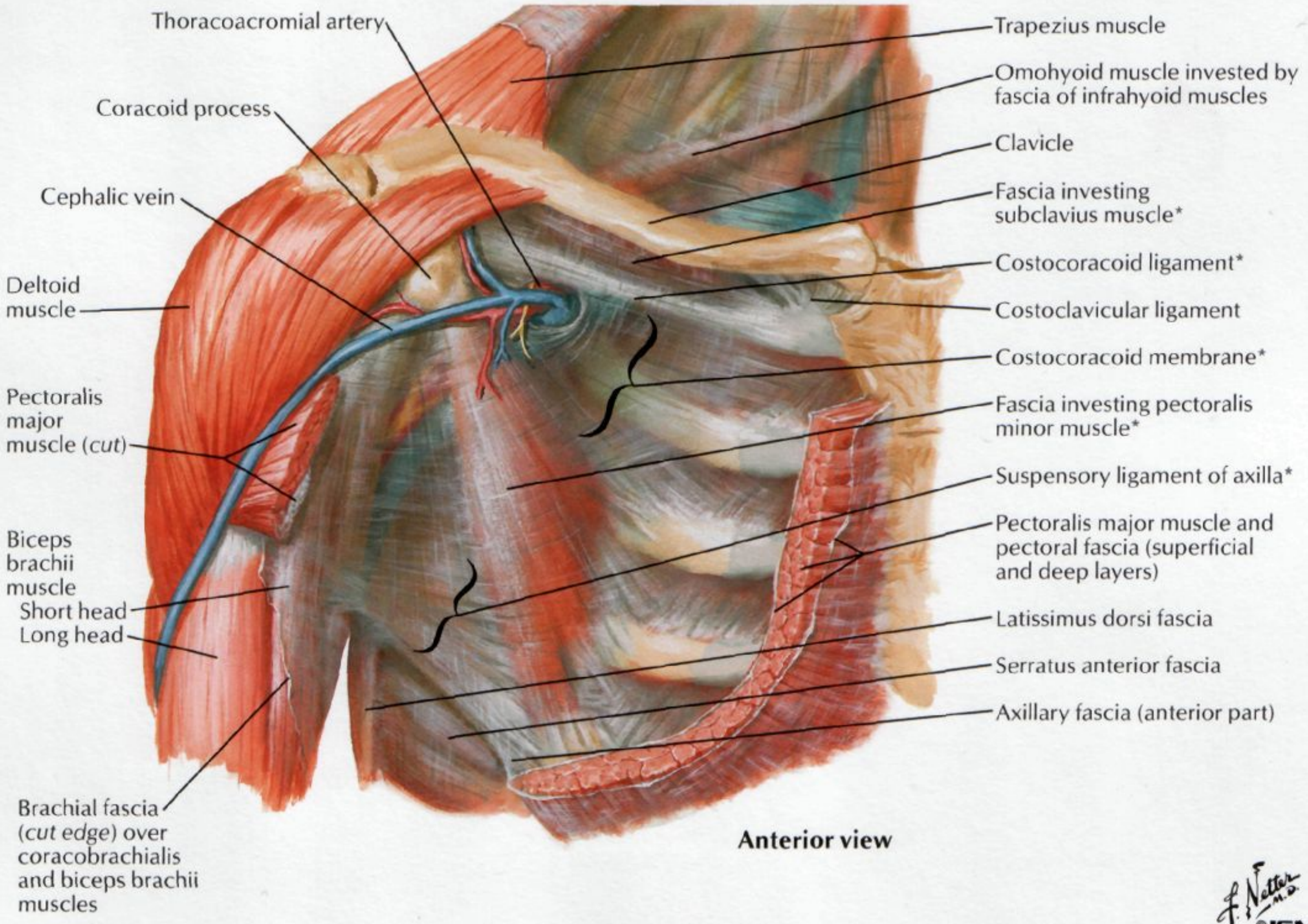
Posterior view

Pectoral, Clavipectoral and Axillary Fasciae

SEE ALSO PLATE 182


Thoracoacromial artery
Coracoid process
Cephalic vein
Deltoid muscle
Pectoralis major muscle (*cut*)
Biceps brachii muscle
Short head
Long head
Brachial fascia (*cut edge*) over coracobrachialis and biceps brachii muscles
Trapezius muscle
Omohyoid muscle invested by fascia of infrahyoid muscles
Clavicle
Fascia investing subclavius muscle*
Costocoracoid ligament*
Costoclavicular ligament
Costocoracoid membrane*
Fascia investing pectoralis minor muscle*
Suspensory ligament of axilla*
Pectoralis major muscle and pectoral fascia (superficial and deep layers)
Latissimus dorsi fascia
Serratus anterior fascia
Axillary fascia (anterior part)

Anterior view

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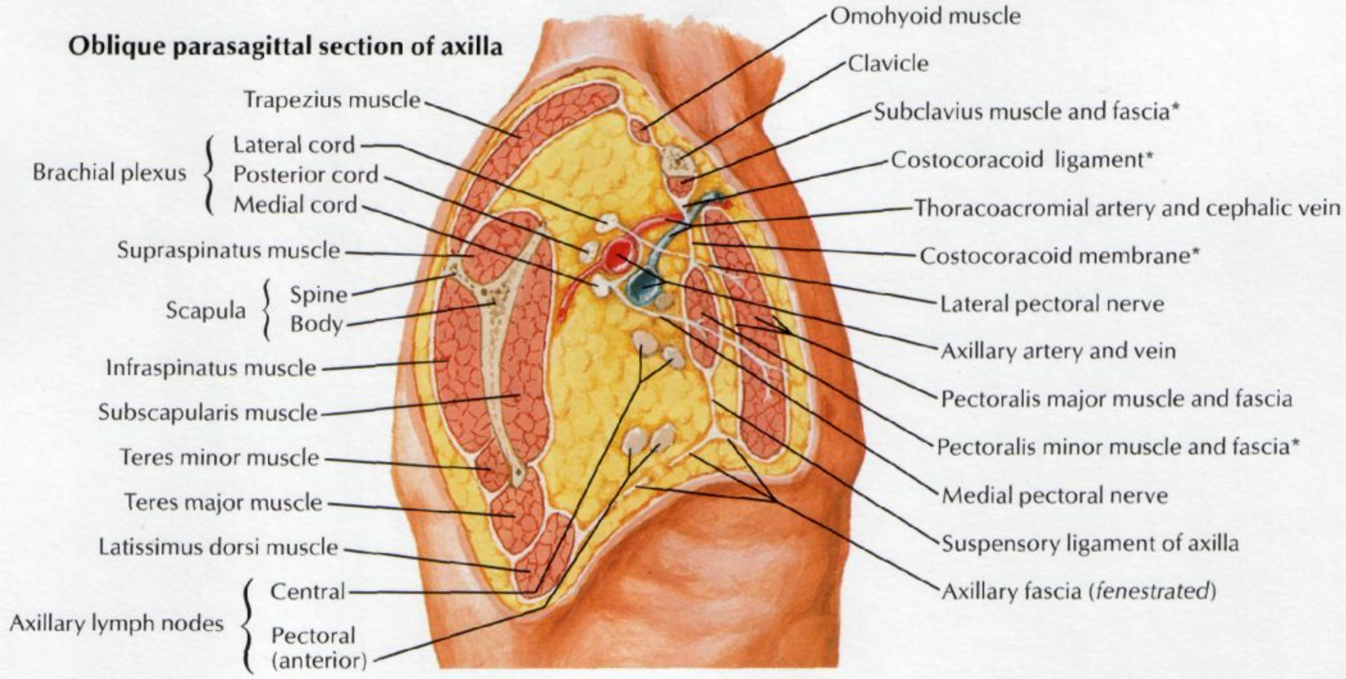
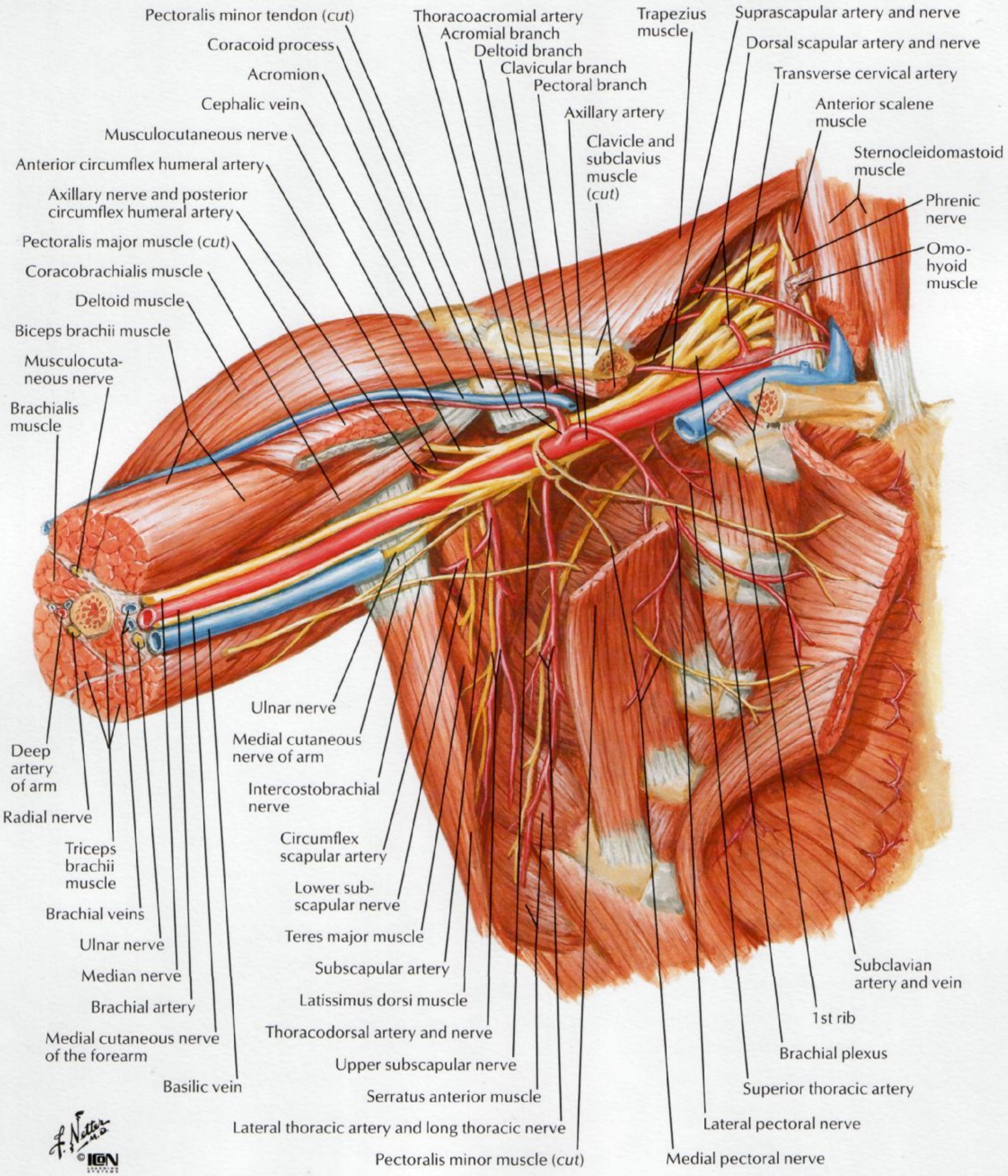
Oblique parasagittal section of axilla

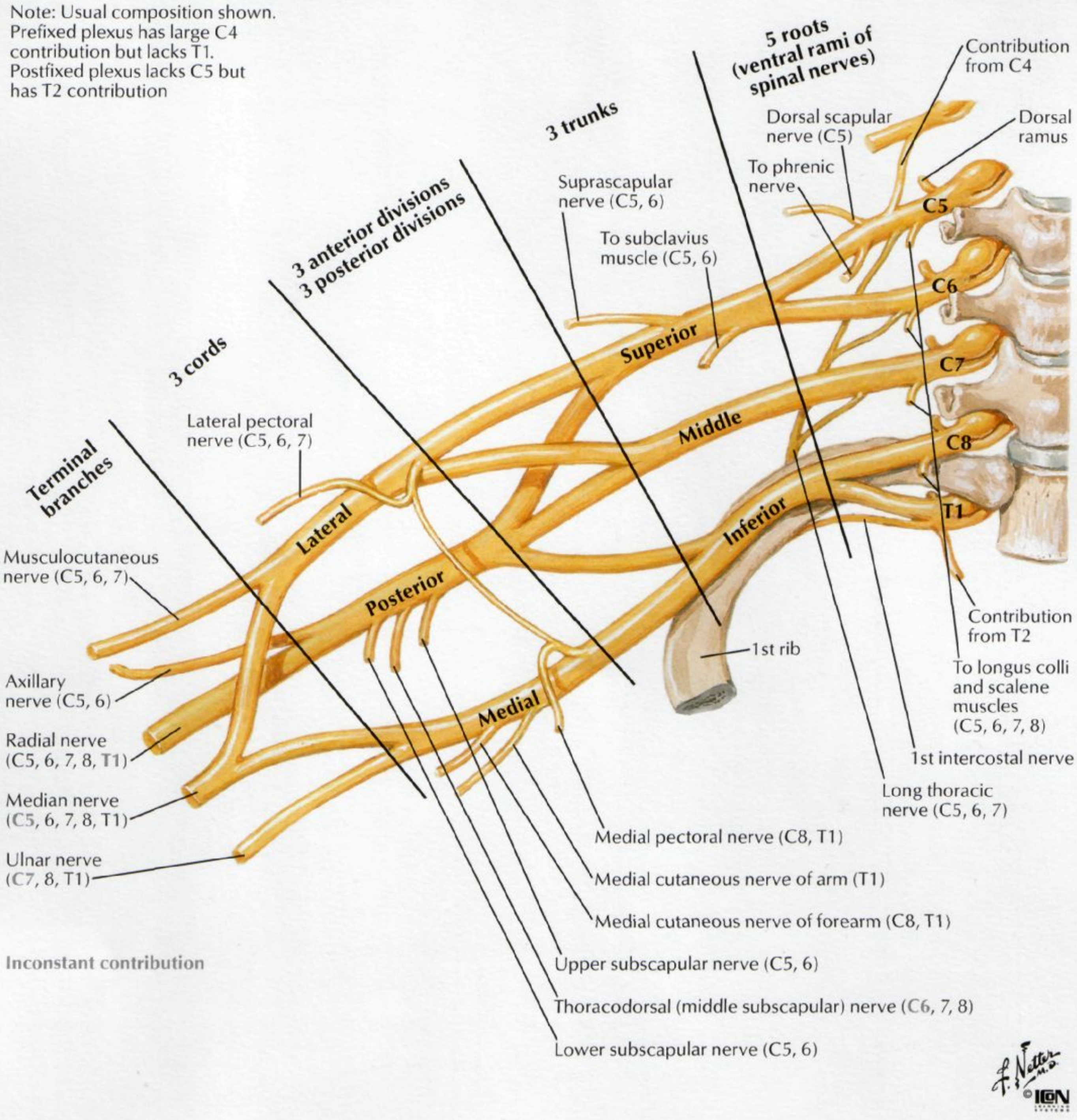


*Components of clavipectoral fascia

Axilla (Dissection): Anterior View



Brachial Plexus: Schema


5 roots (ventral rami of spinal nerves)
3 trunks
3 anterior divisions
3 posterior divisions
3 cords
Terminal branches
Contribution from C4
Dorsal scapular nerve (C5)
Dorsal ramus
To phrenic nerve
Suprascapular nerve (C5, 6)
To subclavius muscle (C5, 6)
C5
C6
C7
C8
T1
Superior
Middle
Inferior
Lateral pectoral nerve (C5, 6, 7)
Lateral
Posterior
Medial
Musculocutaneous nerve (C5, 6, 7)
Axillary nerve (C5, 6)
Radial nerve (C5, 6, 7, 8, T1)
Median nerve (C5, 6, 7, 8, T1)
Ulnar nerve (C7, 8, T1)
1st rib
Contribution from T2
To longus colli and scalene muscles (C5, 6, 7, 8)
1st intercostal nerve
Long thoracic nerve (C5, 6, 7)
Medial pectoral nerve (C8, T1)
Medial cutaneous nerve of arm (T1)
Medial cutaneous nerve of forearm (C8, T1)
Upper subscapular nerve (C5, 6)
Thoracodorsal (middle subscapular) nerve (C6, 7, 8)
Lower subscapular nerve (C5, 6)
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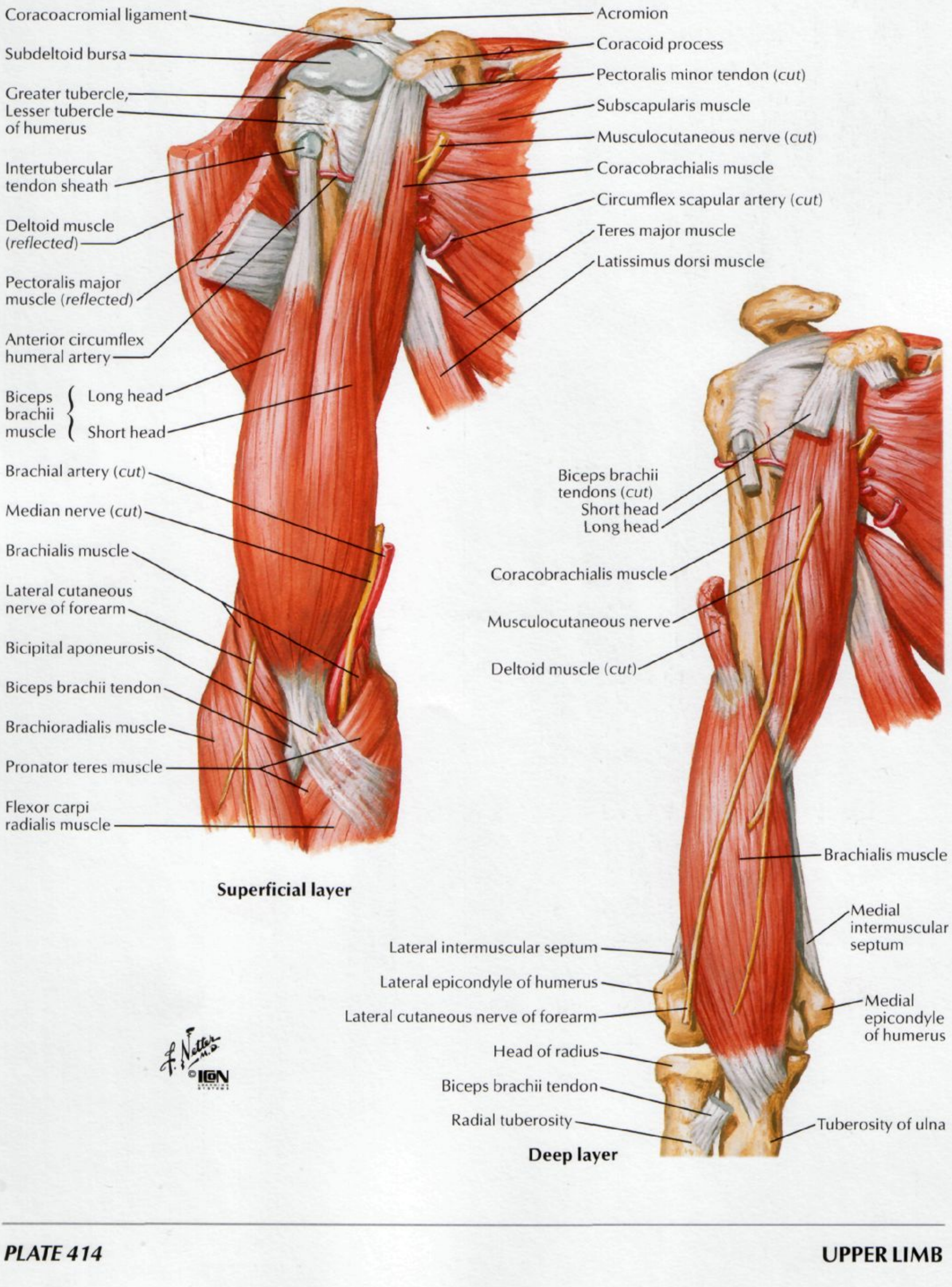
Note: Usual composition shown. Prefixed plexus has large C4 contribution but lacks T1. Postfixed plexus lacks C5 but has T2 contribution

Inconstant contribution

Muscles of Arm: Anterior Views

SEE ALSO PLATE 457



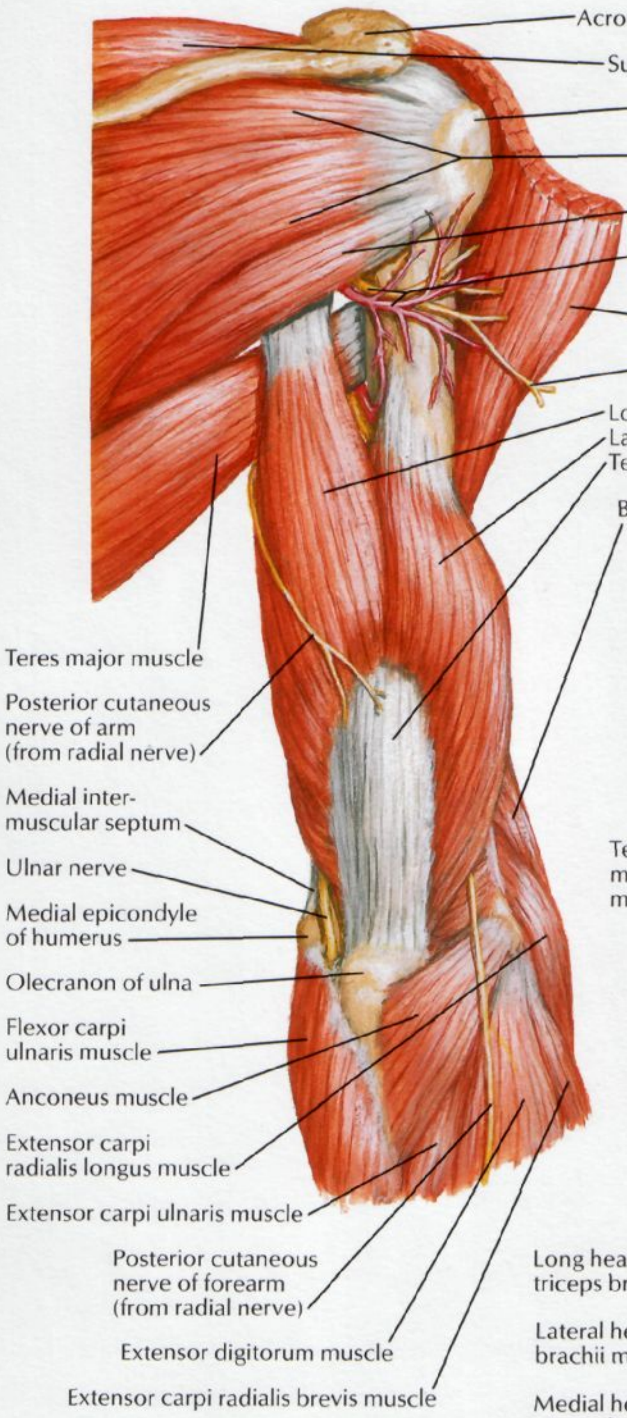
Superficial layer

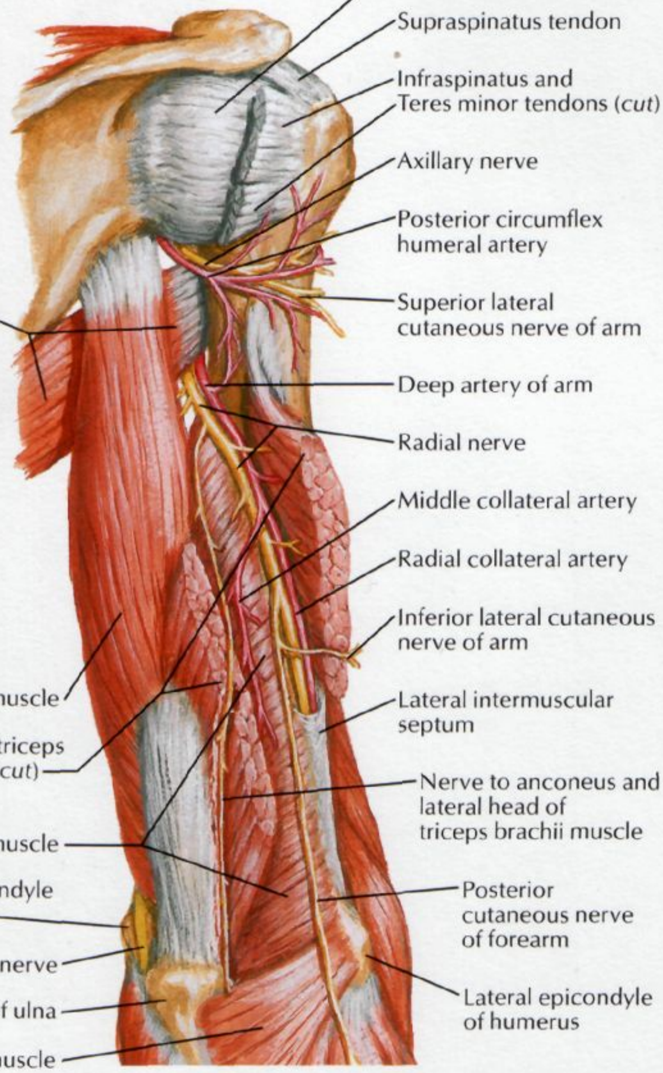
Deep layer

Muscles of Arm: Posterior Views

SEE ALSO PLATE 460

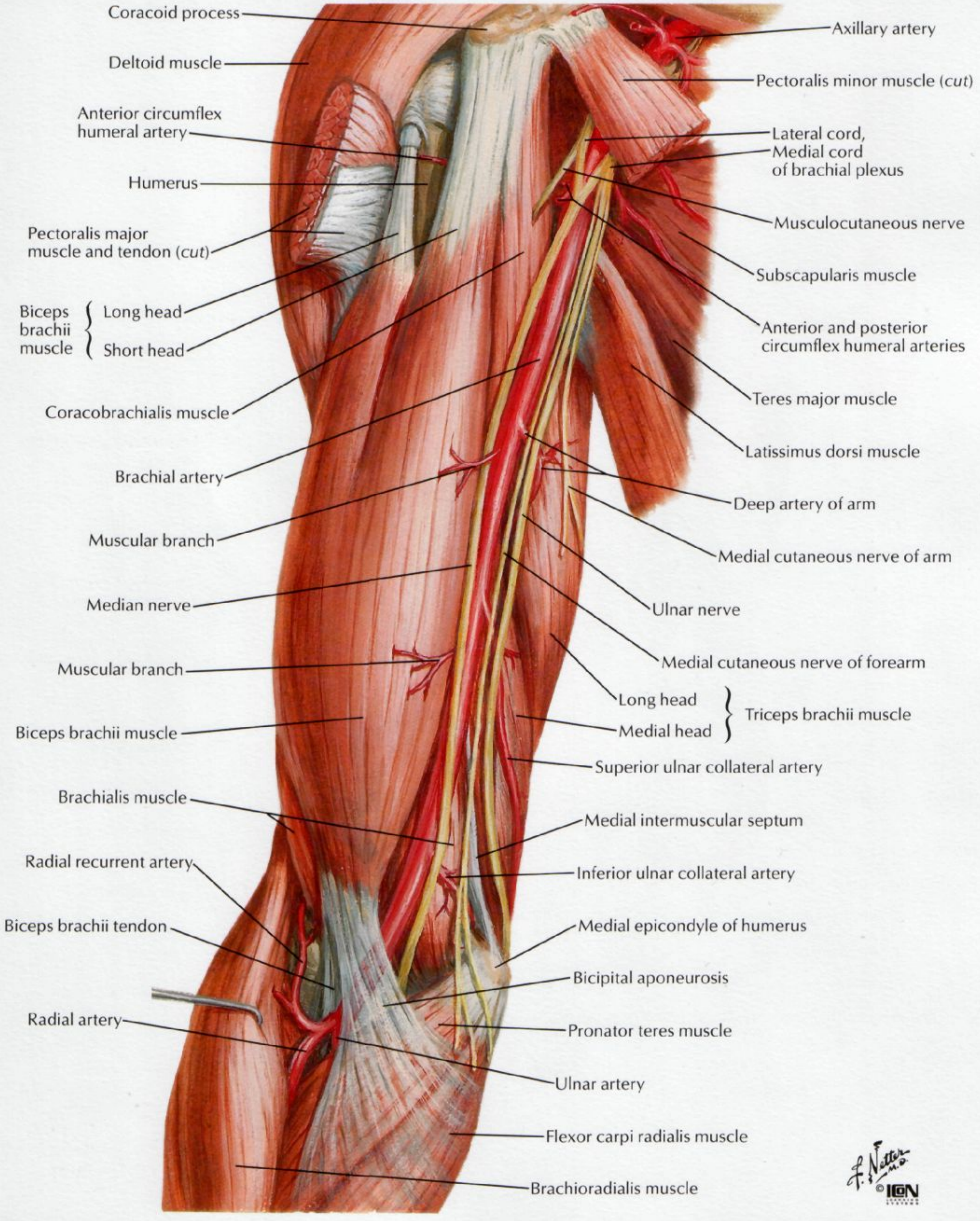
Superficial layer


Acromion
Supraspinatus muscle
Greater tubercle of humerus
Infraspinatus muscle
Teres minor muscle
Axillary nerve and posterior circumflex humeral artery
Deltoid muscle (*cut and reflected*)
Superior lateral cutaneous nerve of arm
Long head
Lateral head
Tendon
Triceps brachii muscle
Brachioradialis muscle
Teres major muscle
Posterior cutaneous nerve of arm (from radial nerve)
Medial intermuscular septum
Ulnar nerve
Medial epicondyle of humerus
Olecranon of ulna
Flexor carpi ulnaris muscle
Anconeus muscle
Extensor carpi radialis longus muscle
Extensor carpi ulnaris muscle
Posterior cutaneous nerve of forearm (from radial nerve)
Extensor digitorum muscle
Extensor carpi radialis brevis muscle


Capsule of shoulder joint
Supraspinatus tendon
Infraspinatus and Teres minor tendons (*cut*)
Axillary nerve
Posterior circumflex humeral artery
Teres major muscle
Superior lateral cutaneous nerve of arm
Deep artery of arm
Radial nerve
Middle collateral artery
Radial collateral artery
Inferior lateral cutaneous nerve of arm
Long head of triceps brachii muscle
Lateral intermuscular septum
Lateral head of triceps brachii muscle (*cut*)
Nerve to anconeus and lateral head of triceps brachii muscle
Medial head of triceps brachii muscle
Medial epicondyle of humerus
Posterior cutaneous nerve of forearm
Ulnar nerve
Lateral epicondyle of humerus
Olecranon of ulna
Anconeus muscle

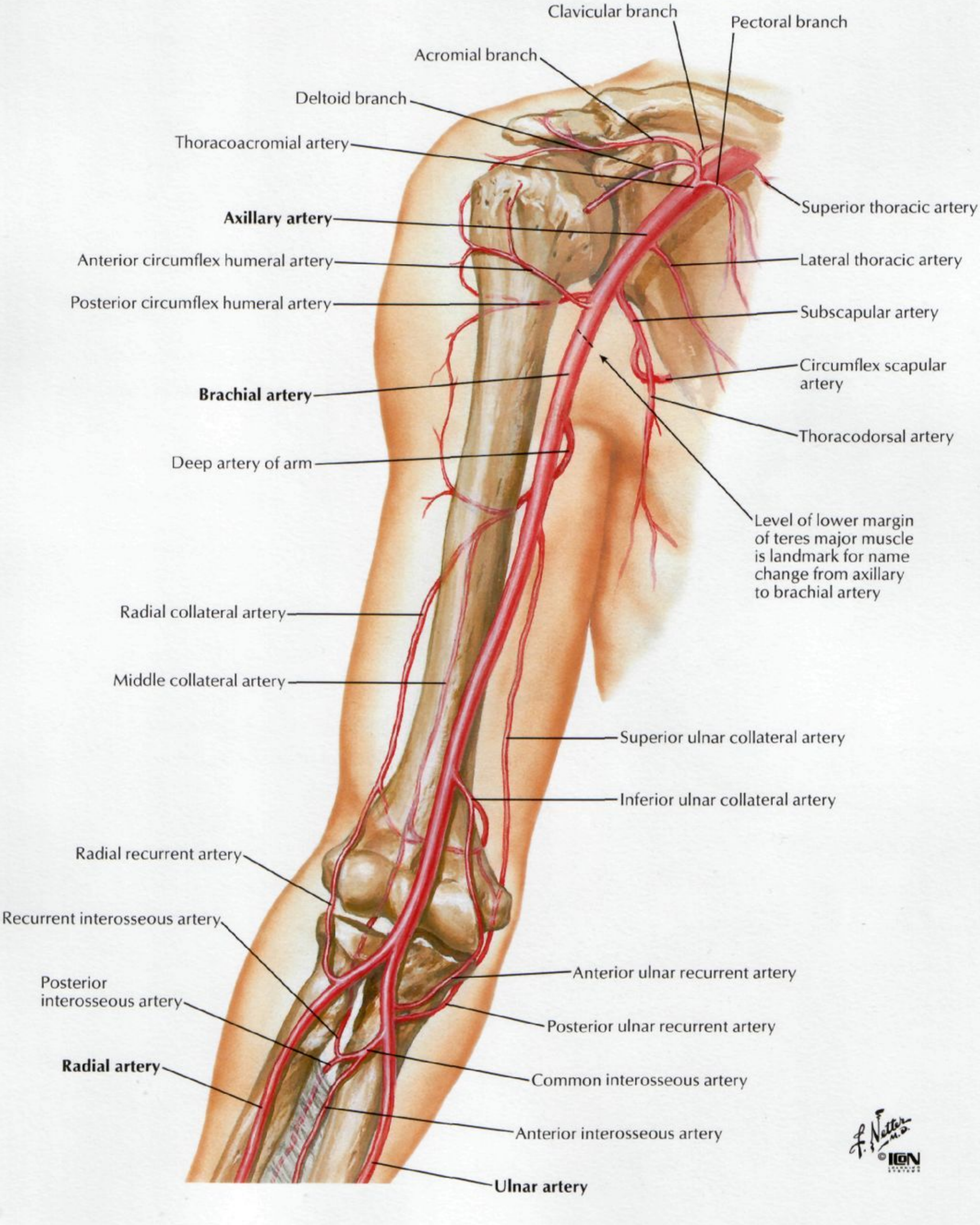
Deep layer

Brachial Artery In Situ



Brachial Artery and Anastomoses Around Elbow

SEE ALSO PLATE 410


Clavicular branch
Pectoral branch
Acromial branch
Deltoid branch
Thoracoacromial artery
Superior thoracic artery
Axillary artery
Anterior circumflex humeral artery
Lateral thoracic artery
Posterior circumflex humeral artery
Subscapular artery
Circumflex scapular artery
Brachial artery
Thoracodorsal artery
Deep artery of arm
Level of lower margin of teres major muscle is landmark for name change from axillary to brachial artery
Radial collateral artery
Middle collateral artery
Superior ulnar collateral artery
Inferior ulnar collateral artery
Radial recurrent artery
Recurrent interosseous artery
Anterior ulnar recurrent artery
Posterior interosseous artery
Posterior ulnar recurrent artery
Radial artery
Common interosseous artery
Anterior interosseous artery
Ulnar artery
F. Netter M.D.
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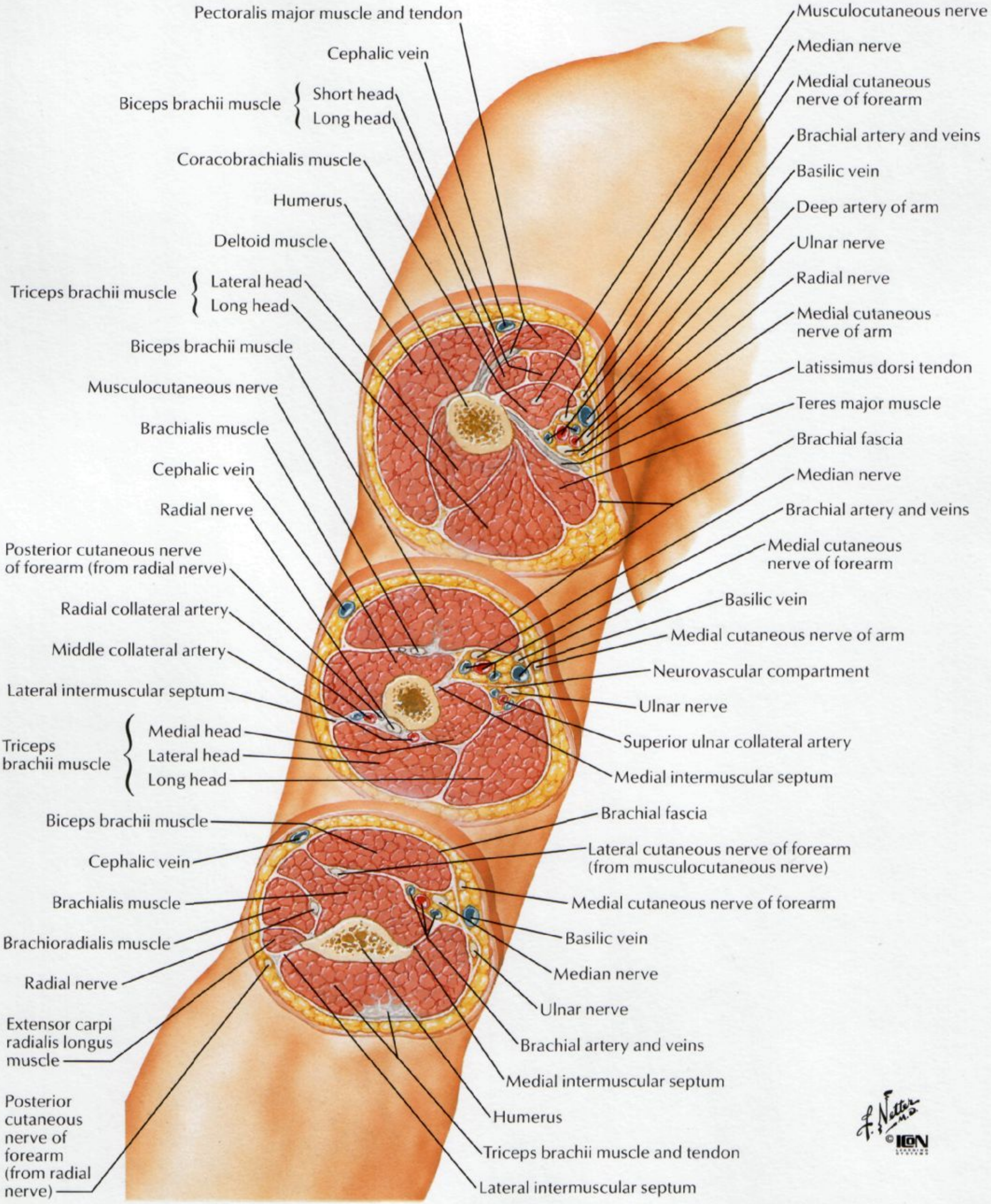
Arm: Serial Cross Sections


Pectoralis major muscle and tendon
Cephalic vein
Biceps brachii muscle
Short head
Long head
Coracobrachialis muscle
Humerus
Deltoid muscle
Triceps brachii muscle
Lateral head
Long head
Biceps brachii muscle
Musculocutaneous nerve
Brachialis muscle
Cephalic vein
Radial nerve
Posterior cutaneous nerve of forearm (from radial nerve)
Radial collateral artery
Middle collateral artery
Lateral intermuscular septum
Triceps brachii muscle
Medial head
Lateral head
Long head
Biceps brachii muscle
Cephalic vein
Brachialis muscle
Brachioradialis muscle
Radial nerve
Extensor carpi radialis longus muscle
Posterior cutaneous nerve of forearm (from radial nerve)
Musculocutaneous nerve
Median nerve
Medial cutaneous nerve of forearm
Brachial artery and veins
Basilic vein
Deep artery of arm
Ulnar nerve
Radial nerve
Medial cutaneous nerve of arm
Latissimus dorsi tendon
Teres major muscle
Brachial fascia
Median nerve
Brachial artery and veins
Medial cutaneous nerve of forearm
Basilic vein
Medial cutaneous nerve of arm
Neurovascular compartment
Ulnar nerve
Superior ulnar collateral artery
Medial intermuscular septum
Brachial fascia
Lateral cutaneous nerve of forearm (from musculocutaneous nerve)
Medial cutaneous nerve of forearm
Basilic vein
Median nerve
Ulnar nerve
Brachial artery and veins
Medial intermuscular septum
Humerus
Triceps brachii muscle and tendon
Lateral intermuscular septum
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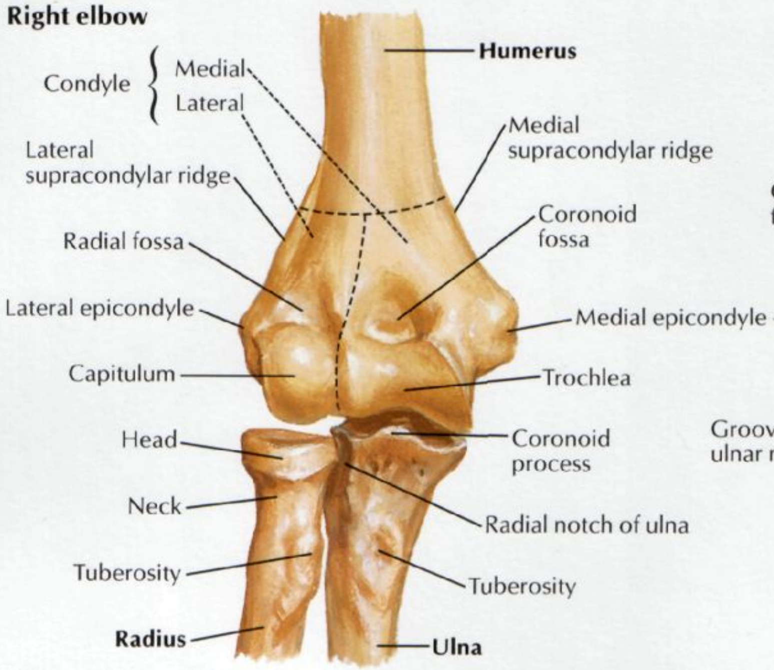
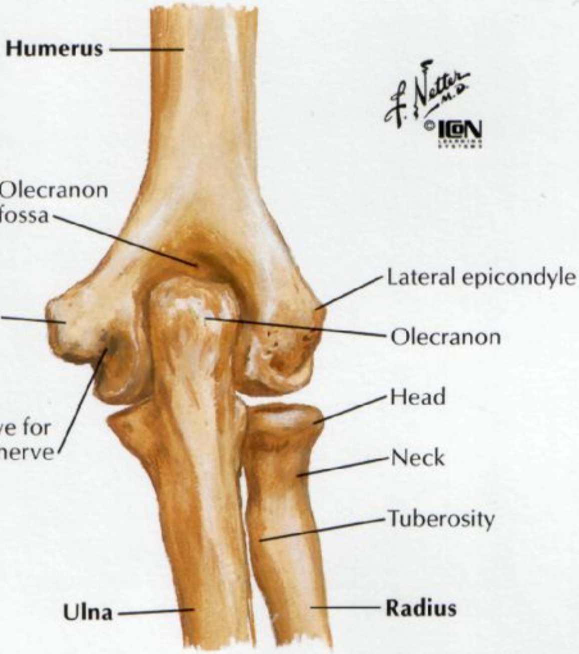
Bones of Elbow

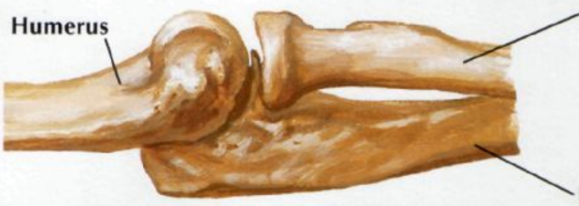
Right elbow



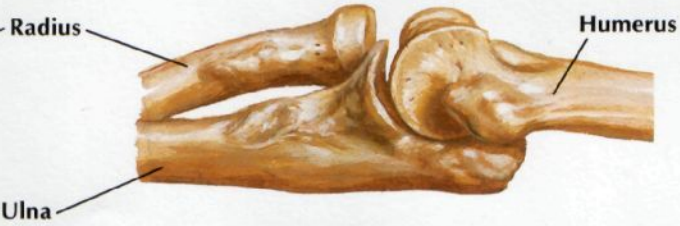
In extension: anterior view



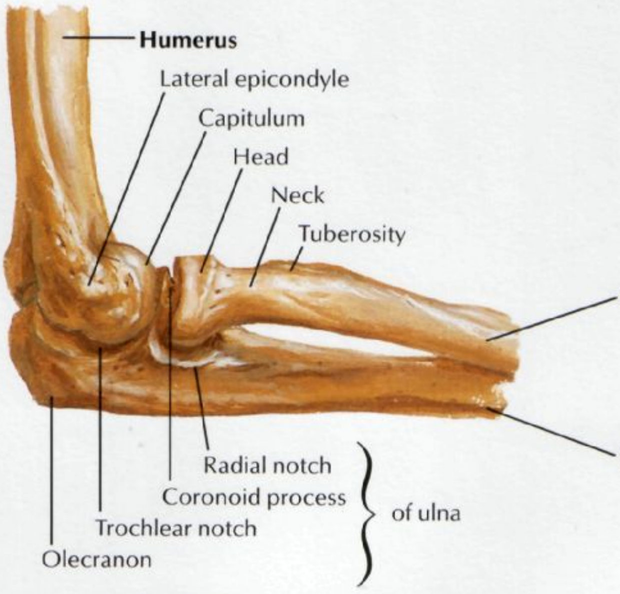
In extension: posterior view



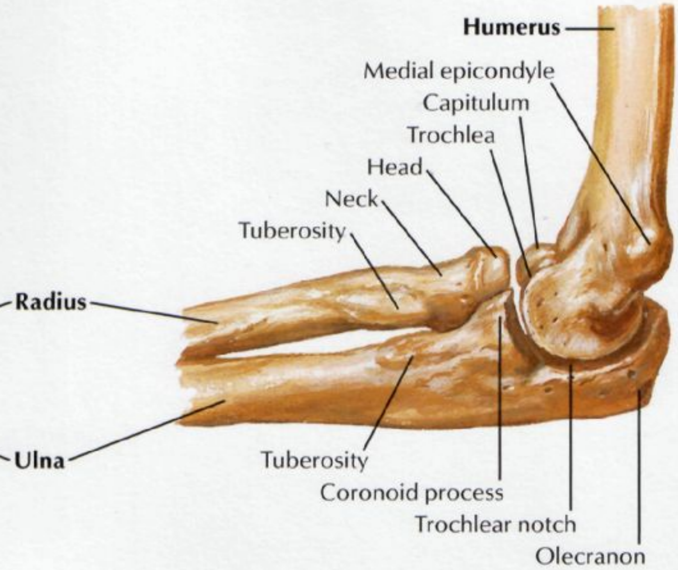
In extension: lateral view



In extension: medial view



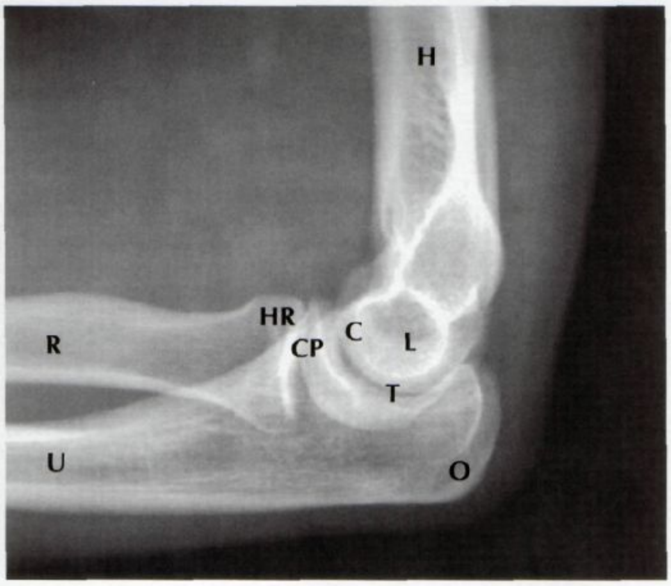
In 90° flexion: lateral view



In 90° flexion: medial view

Elbow: Radiographs

SEE ALSO PLATE 419

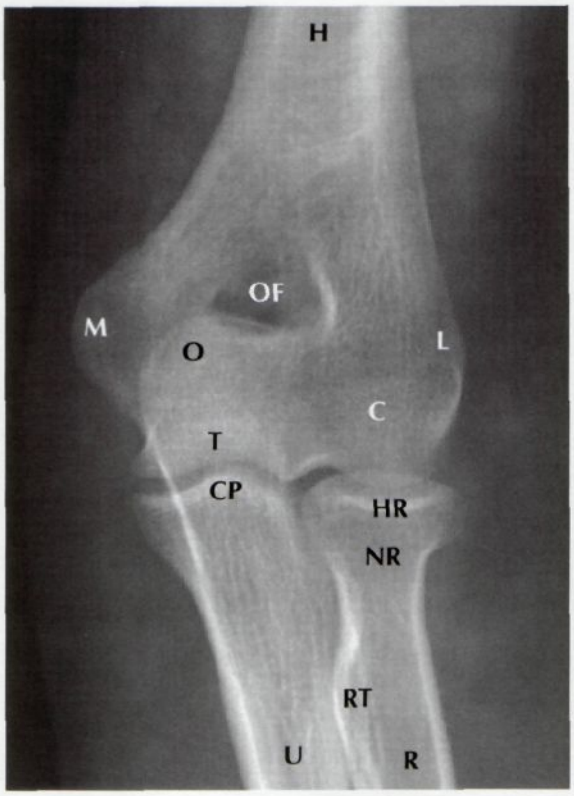


Lateral radiograph

C	Capitulum
CP	Coronoid process of ulna
H	Humerus
HR	Head of radius
L	Lateral epicondyle
O	Olecranon
R	Radius
T	Trochlear notch
U	Ulna

Anteroposterior radiograph

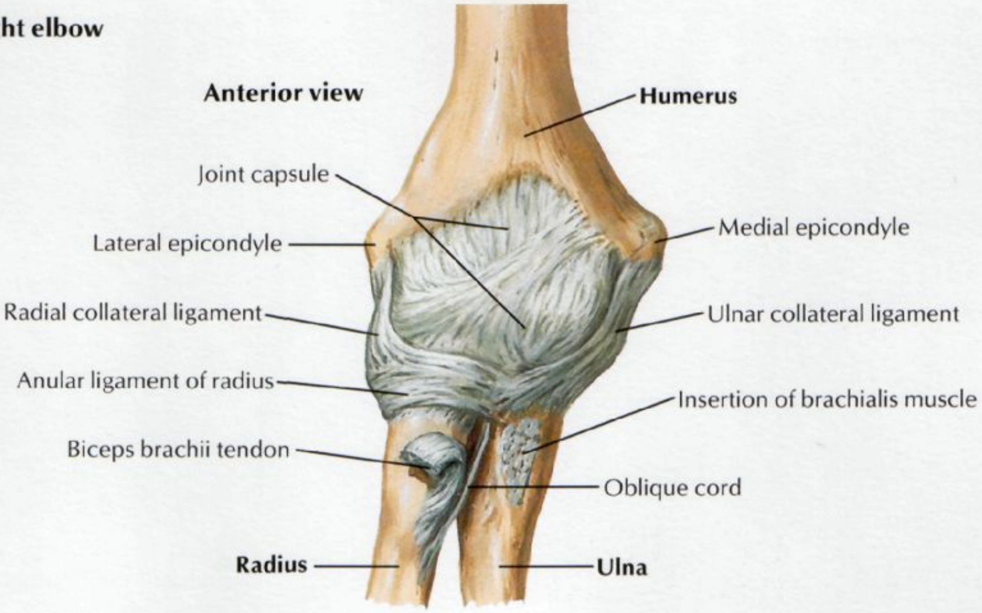
C	Capitulum
CP	Coronoid process of ulna
H	Humerus
HR	Head of radius
L	Lateral epicondyle
M	Medial of epicondyle
NR	Neck of radius
O	Olecranon
OF	Olecranon fossa
R	Radius
T	Trochlea of humerus
RT	Radial tuberosity
U	Ulna

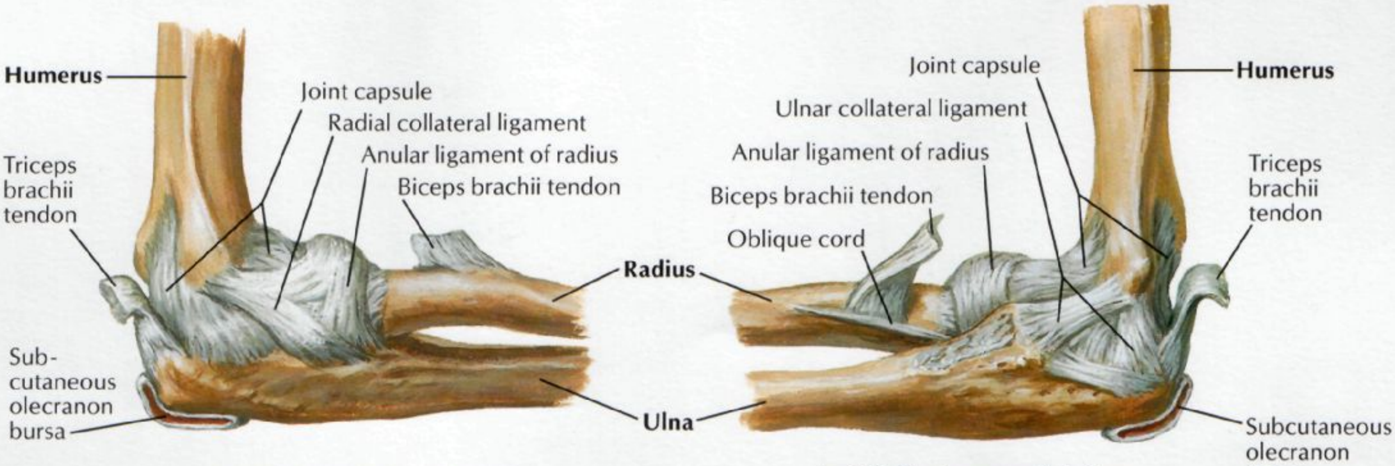


Ligaments of Elbow

Right elbow

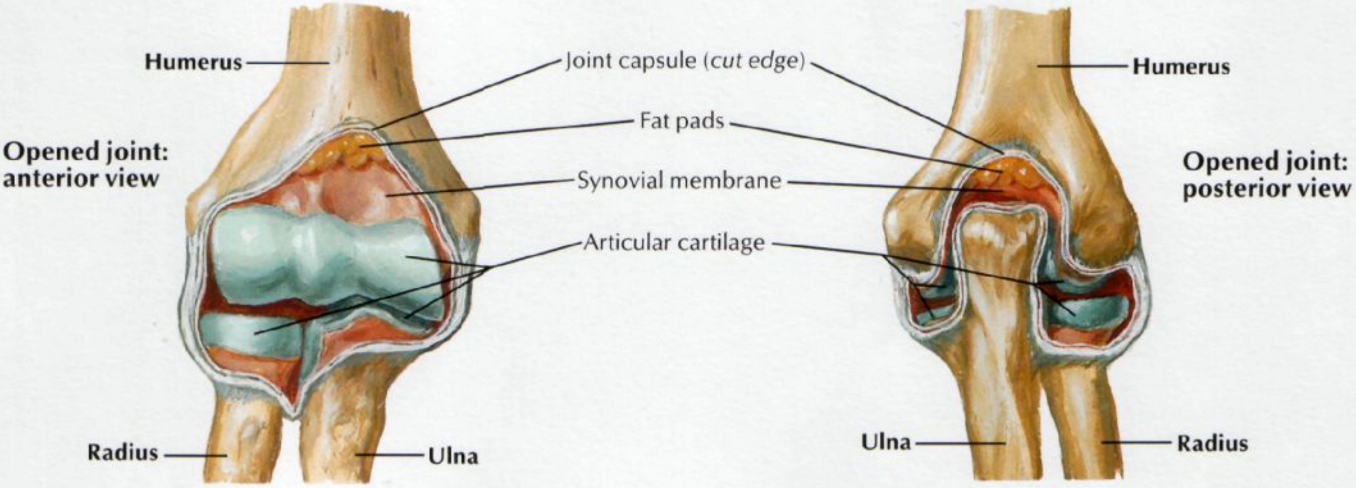
Anterior view


Humerus
Joint capsule
Medial epicondyle
Lateral epicondyle
Radial collateral ligament
Ulnar collateral ligament
Anular ligament of radius
Insertion of brachialis muscle
Biceps brachii tendon
Oblique cord
Radius
Ulna


Humerus
Joint capsule
Radial collateral ligament
Anular ligament of radius
Biceps brachii tendon
Triceps brachii tendon
Sub-cutaneous olecranon bursa
Radius
Ulna
Joint capsule
Humerus
Ulnar collateral ligament
Anular ligament of radius
Biceps brachii tendon
Oblique cord
Triceps brachii tendon
Subcutaneous olecranon bursa

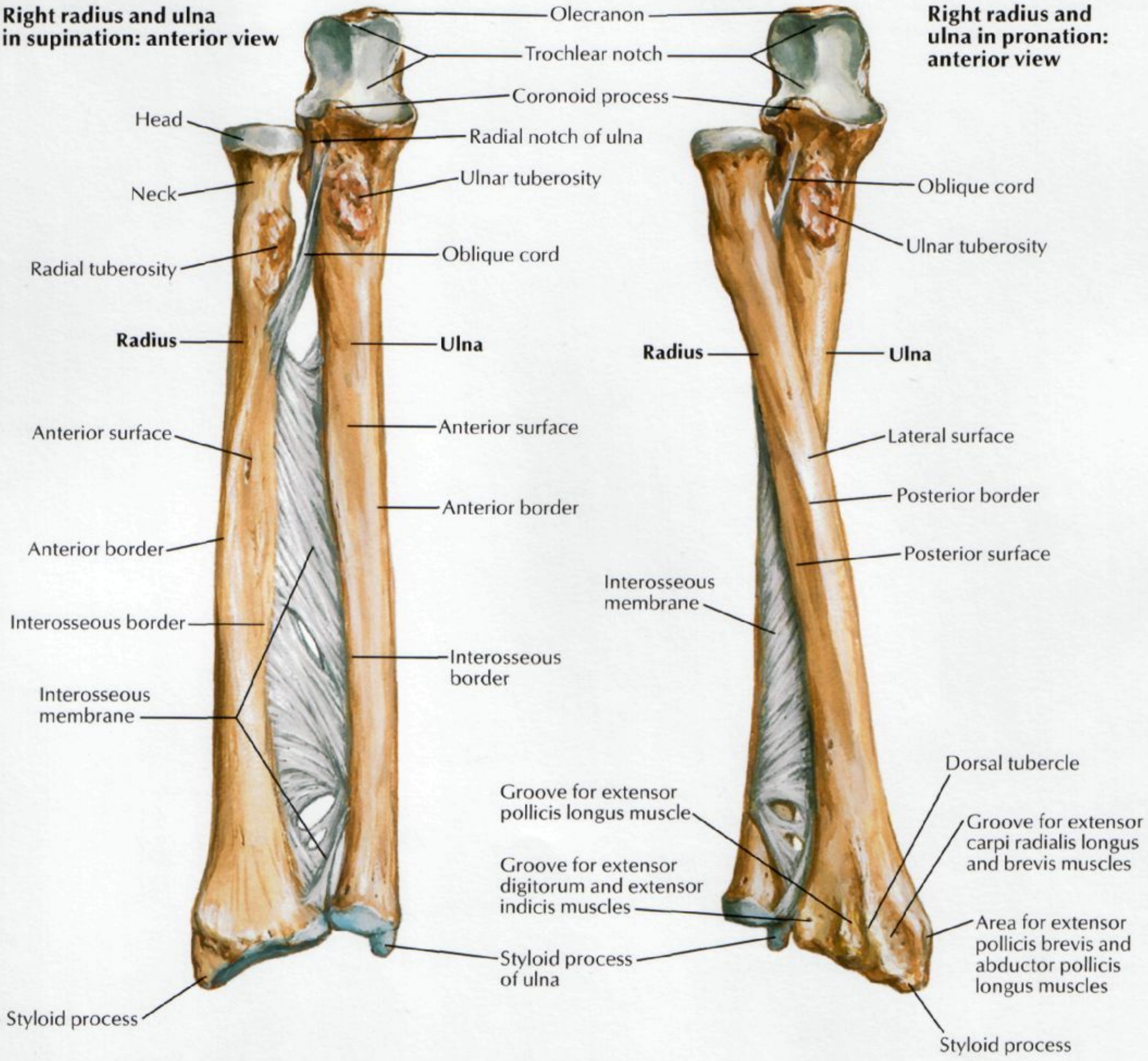
In 90° flexion: lateral view

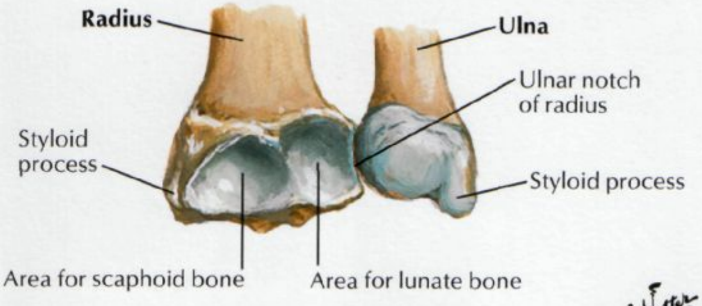
In 90° flexion: medial view



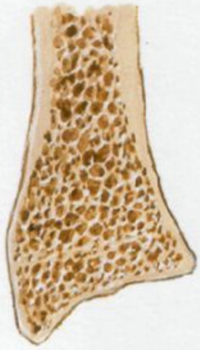
Opened joint: anterior view

Opened joint: posterior view



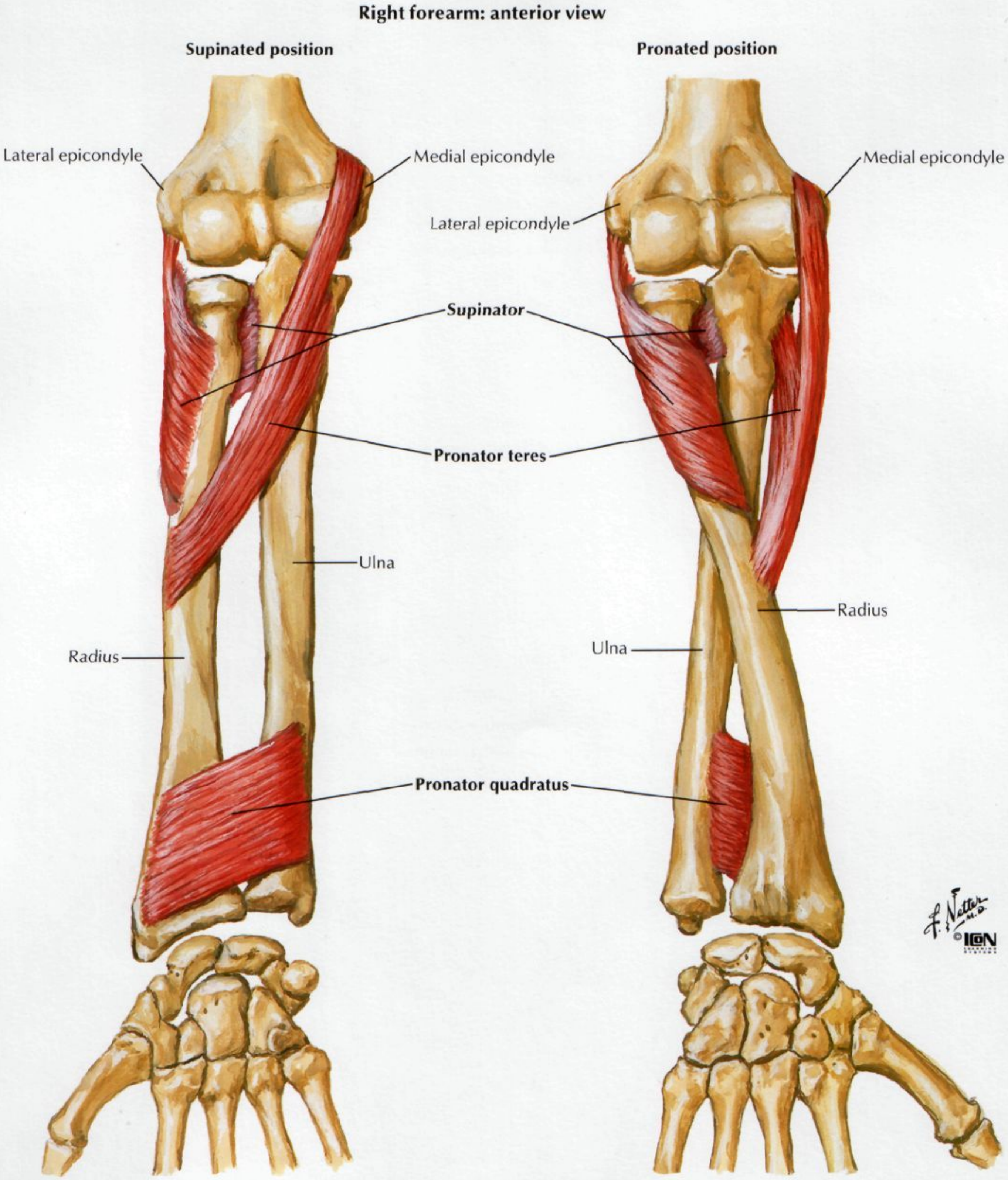


Carpal articular suface

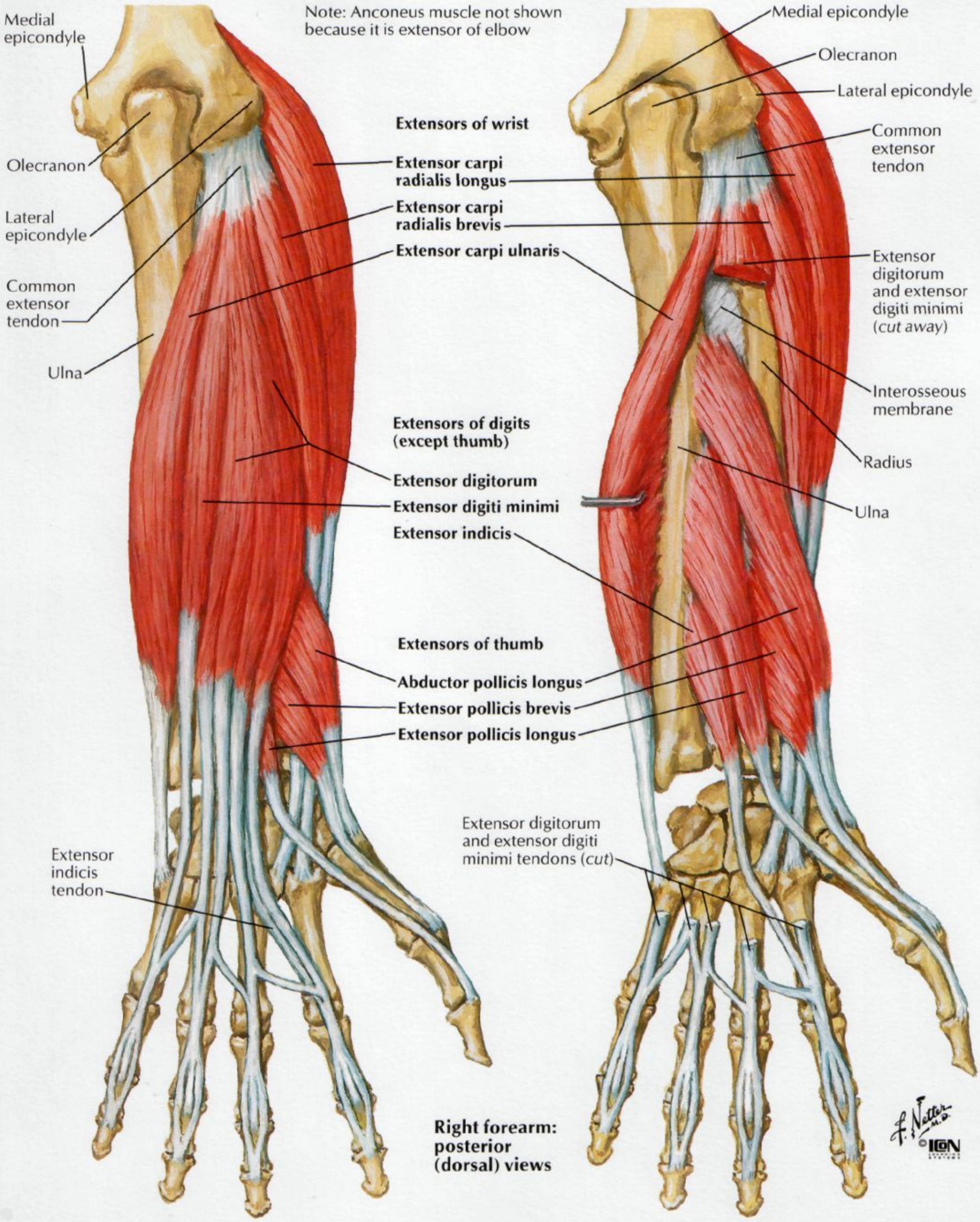


Coronal section of radius demonstrates how thickness of cortical bone of shaft diminishes to thin layer over cancellous bone at distal end

Individual Muscles of Forearm: Rotators of Radius

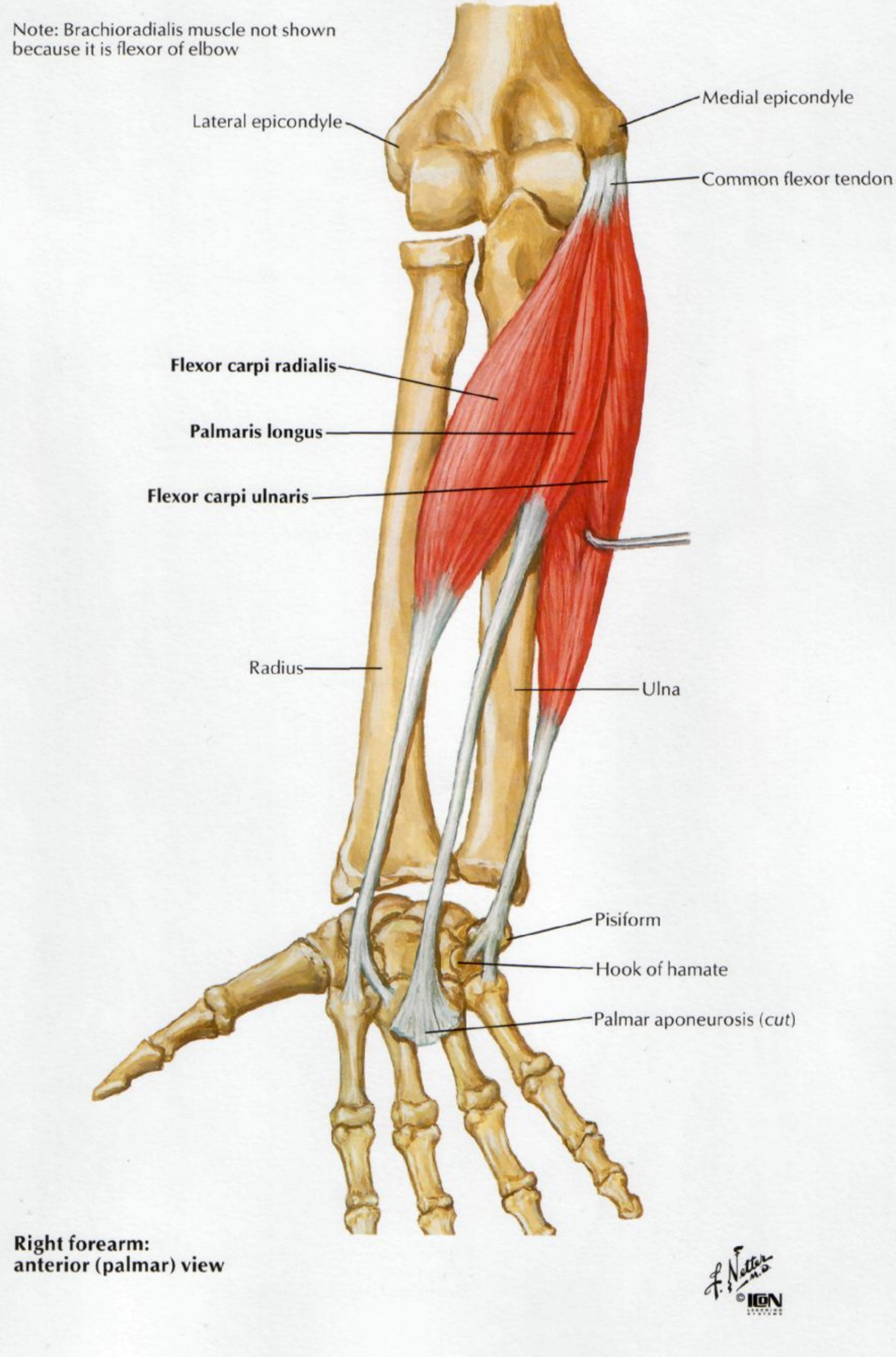


Individual Muscles of Forearm: Extensors of Wrist and Digits


Medial epicondyle
Olecranon
Lateral epicondyle
Common extensor tendon
Ulna
Note: Anconeus muscle not shown because it is extensor of elbow
Extensors of wrist
Extensor carpi radialis longus
Extensor carpi radialis brevis
Extensor carpi ulnaris
Extensors of digits (except thumb)
Extensor digitorum
Extensor digiti minimi
Extensor indicis
Extensors of thumb
Abductor pollicis longus
Extensor pollicis brevis
Extensor pollicis longus
Extensor indicis tendon
Medial epicondyle
Olecranon
Lateral epicondyle
Common extensor tendon
Extensor digitorum and extensor digiti minimi (*cut away*)
Interosseous membrane
Radius
Ulna
Extensor digitorum and extensor digiti minimi tendons (*cut*)

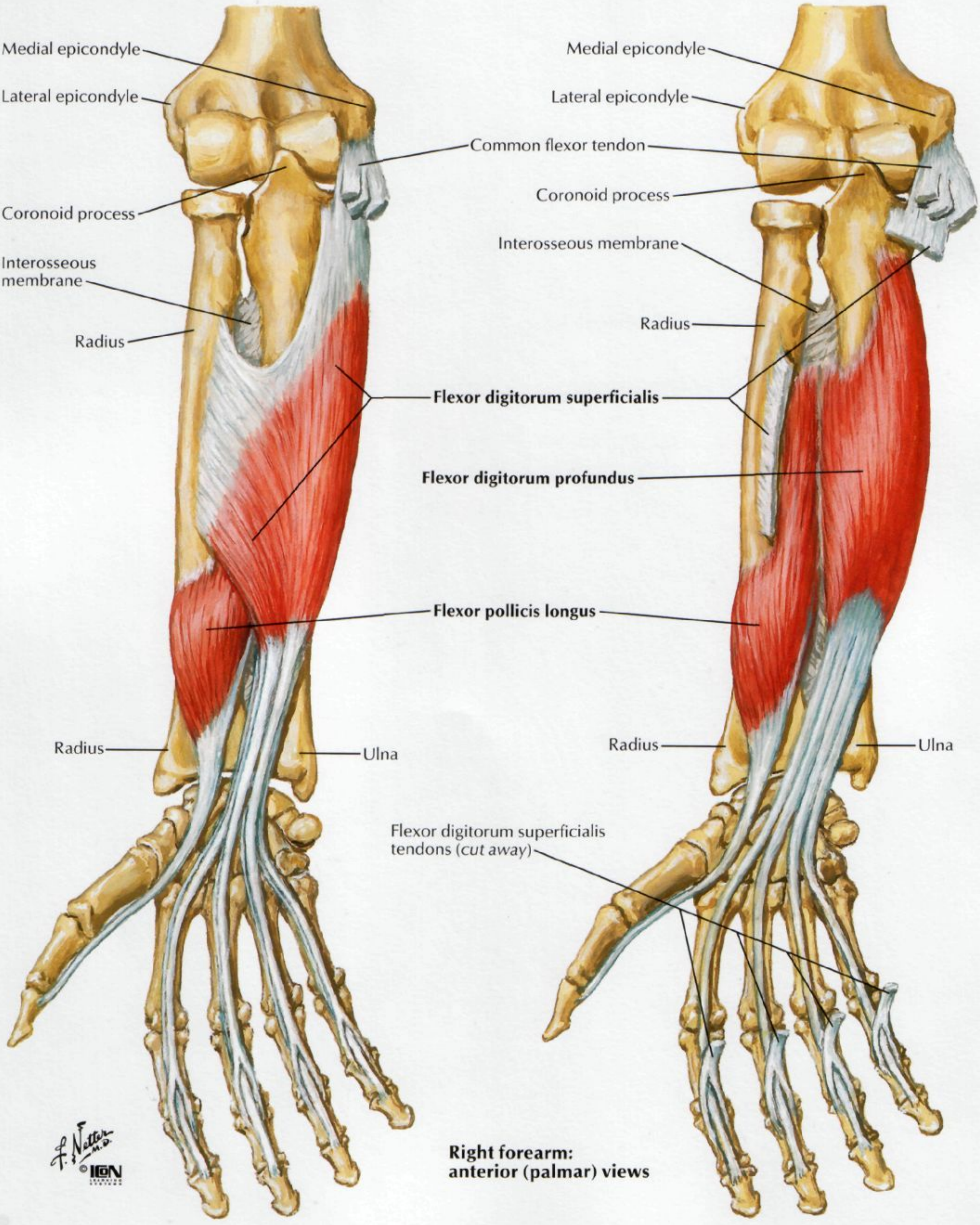
Right forearm: posterior (dorsal) views

Individual Muscles of Forearm: Flexors of Wrist



Right forearm: anterior (palmar) view

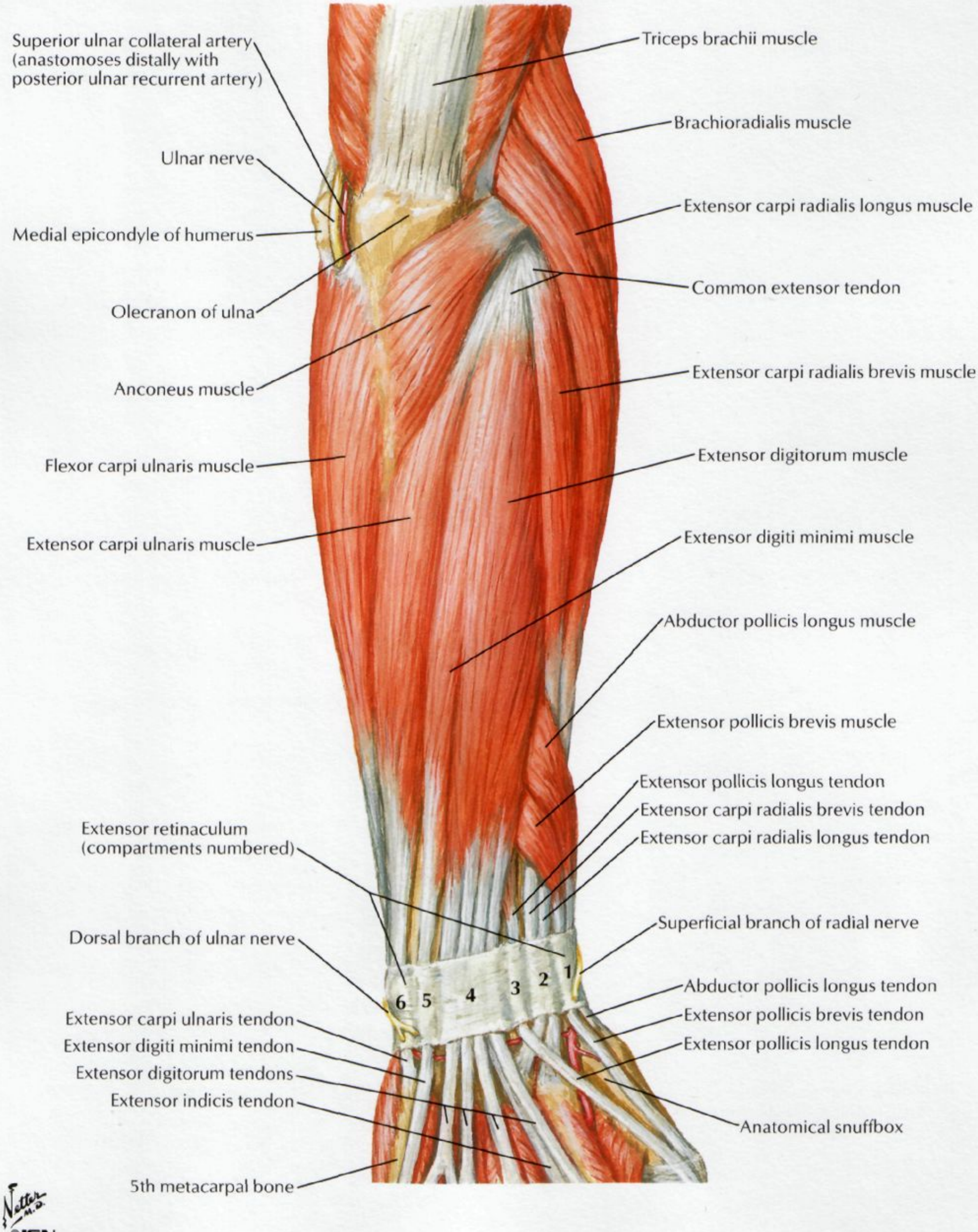
Individual Muscles of Forearm: Flexors of Digits



Right forearm: anterior (palmar) views

Muscles of Forearm (Superficial Layer): Posterior View

SEE ALSO PLATES 453, 461


Superior ulnar collateral artery (anastomoses distally with posterior ulnar recurrent artery)
Ulnar nerve
Medial epicondyle of humerus
Olecranon of ulna
Anconeus muscle
Flexor carpi ulnaris muscle
Extensor carpi ulnaris muscle
Extensor retinaculum (compartments numbered)
Dorsal branch of ulnar nerve
Extensor carpi ulnaris tendon
Extensor digiti minimi tendon
Extensor digitorum tendons
Extensor indicis tendon
5th metacarpal bone
Triceps brachii muscle
Brachioradialis muscle
Extensor carpi radialis longus muscle
Common extensor tendon
Extensor carpi radialis brevis muscle
Extensor digitorum muscle
Extensor digiti minimi muscle
Abductor pollicis longus muscle
Extensor pollicis brevis muscle
Extensor pollicis longus tendon
Extensor carpi radialis brevis tendon
Extensor carpi radialis longus tendon
Superficial branch of radial nerve
Abductor pollicis longus tendon
Extensor pollicis brevis tendon
Extensor pollicis longus tendon
Anatomical snuffbox
6
5
4
3
2
1

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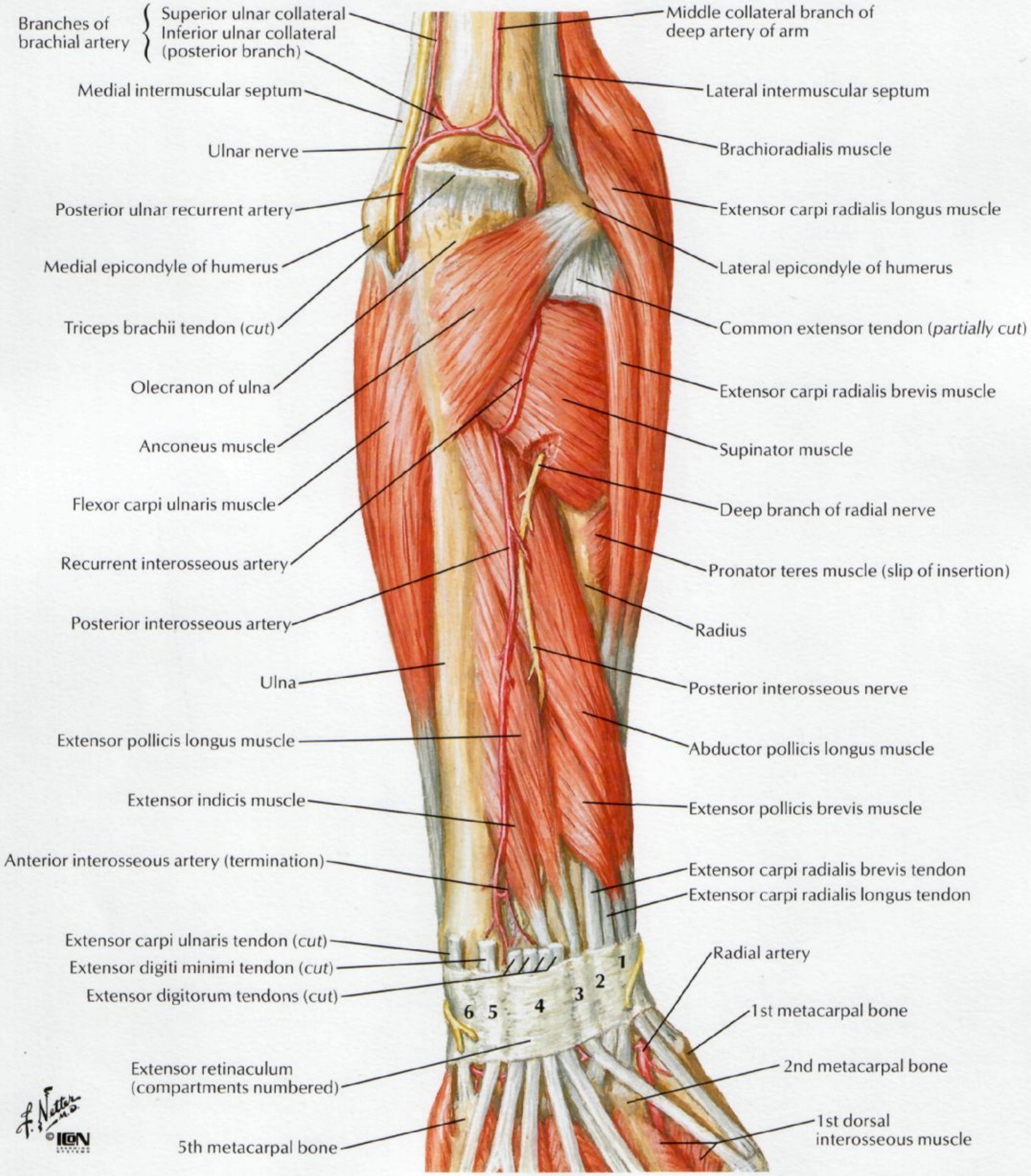
Muscles of Forearm (Deep Layer): Posterior View

SEE ALSO PLATES 453, 461


Branches of brachial artery
Superior ulnar collateral
Inferior ulnar collateral (posterior branch)
Medial intermuscular septum
Ulnar nerve
Posterior ulnar recurrent artery
Medial epicondyle of humerus
Triceps brachii tendon (*cut*)
Olecranon of ulna
Anconeus muscle
Flexor carpi ulnaris muscle
Recurrent interosseous artery
Posterior interosseous artery
Ulna
Extensor pollicis longus muscle
Extensor indicis muscle
Anterior interosseous artery (termination)
Extensor carpi ulnaris tendon (*cut*)
Extensor digiti minimi tendon (*cut*)
Extensor digitorum tendons (cut)
Extensor retinaculum (compartments numbered)
5th metacarpal bone
Middle collateral branch of deep artery of arm
Lateral intermuscular septum
Brachioradialis muscle
Extensor carpi radialis longus muscle
Lateral epicondyle of humerus
Common extensor tendon (*partially cut*)
Extensor carpi radialis brevis muscle
Supinator muscle
Deep branch of radial nerve
Pronator teres muscle (slip of insertion)
Radius
Posterior interosseous nerve
Abductor pollicis longus muscle
Extensor pollicis brevis muscle
Extensor carpi radialis brevis tendon
Extensor carpi radialis longus tendon
Radial artery
1st metacarpal bone
2nd metacarpal bone
1st dorsal interosseous muscle
1
2
3
4
5
6
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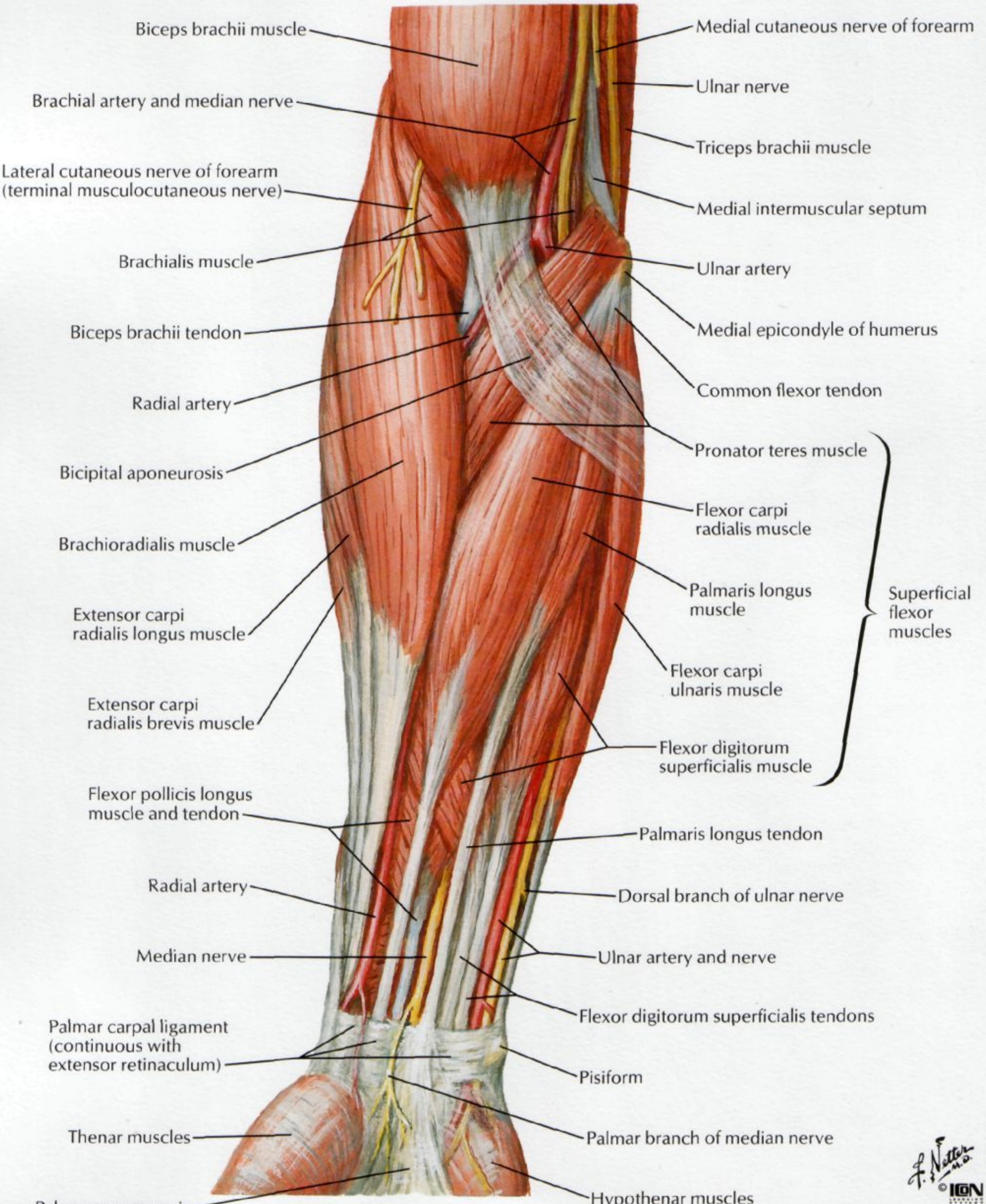
Muscles of Forearm (Superficial Layer): Anterior View

SEE ALSO PLATES 458, 459


Biceps brachii muscle
Brachial artery and median nerve
Lateral cutaneous nerve of forearm (terminal musculocutaneous nerve)
Brachialis muscle
Biceps brachii tendon
Radial artery
Bicipital aponeurosis
Brachioradialis muscle
Extensor carpi radialis longus muscle
Extensor carpi radialis brevis muscle
Flexor pollicis longus muscle and tendon
Radial artery
Median nerve
Palmar carpal ligament (continuous with extensor retinaculum)
Thenar muscles
Palmar aponeurosis
Medial cutaneous nerve of forearm
Ulnar nerve
Triceps brachii muscle
Medial intermuscular septum
Ulnar artery
Medial epicondyle of humerus
Common flexor tendon
Pronator teres muscle
Flexor carpi radialis muscle
Palmaris longus muscle
Flexor carpi ulnaris muscle
Flexor digitorum superficialis muscle
Superficial flexor muscles
Palmaris longus tendon
Dorsal branch of ulnar nerve
Ulnar artery and nerve
Flexor digitorum superficialis tendons
Pisiform
Palmar branch of median nerve
Hypothenar muscles

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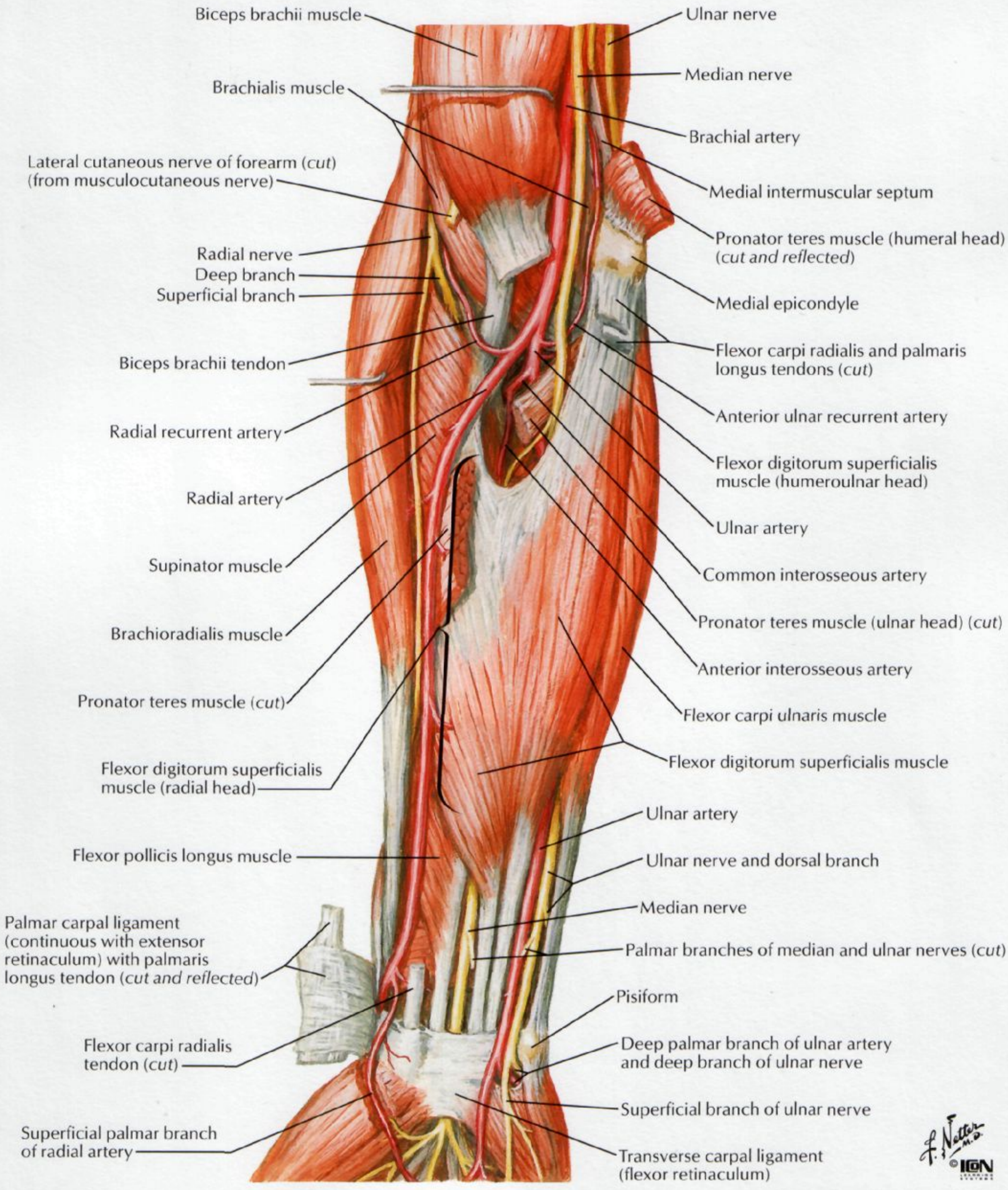
Muscles of Forearm (Intermediate Layer): Anterior View

SEE ALSO PLATES 458, 459


Biceps brachii muscle
Brachialis muscle
Lateral cutaneous nerve of forearm (*cut*) (from musculocutaneous nerve)
Radial nerve
Deep branch
Superficial branch
Biceps brachii tendon
Radial recurrent artery
Radial artery
Supinator muscle
Brachioradialis muscle
Pronator teres muscle (*cut*)
Flexor digitorum superficialis muscle (radial head)
Flexor pollicis longus muscle
Palmar carpal ligament (continuous with extensor retinaculum) with palmaris longus tendon (*cut and reflected*)
Flexor carpi radialis tendon (*cut*)
Superficial palmar branch of radial artery
Ulnar nerve
Median nerve
Brachial artery
Medial intermuscular septum
Pronator teres muscle (humeral head) (*cut and reflected*)
Medial epicondyle
Flexor carpi radialis and palmaris longus tendons (*cut*)
Anterior ulnar recurrent artery
Flexor digitorum superficialis muscle (humeroulnar head)
Ulnar artery
Common interosseous artery
Pronator teres muscle (ulnar head) (*cut*)
Anterior interosseous artery
Flexor carpi ulnaris muscle
Flexor digitorum superficialis muscle
Ulnar artery
Ulnar nerve and dorsal branch
Median nerve
Palmar branches of median and ulnar nerves (*cut*)
Pisiform
Deep palmar branch of ulnar artery and deep branch of ulnar nerve
Superficial branch of ulnar nerve
Transverse carpal ligament (flexor retinaculum)
F. Netter M.D.
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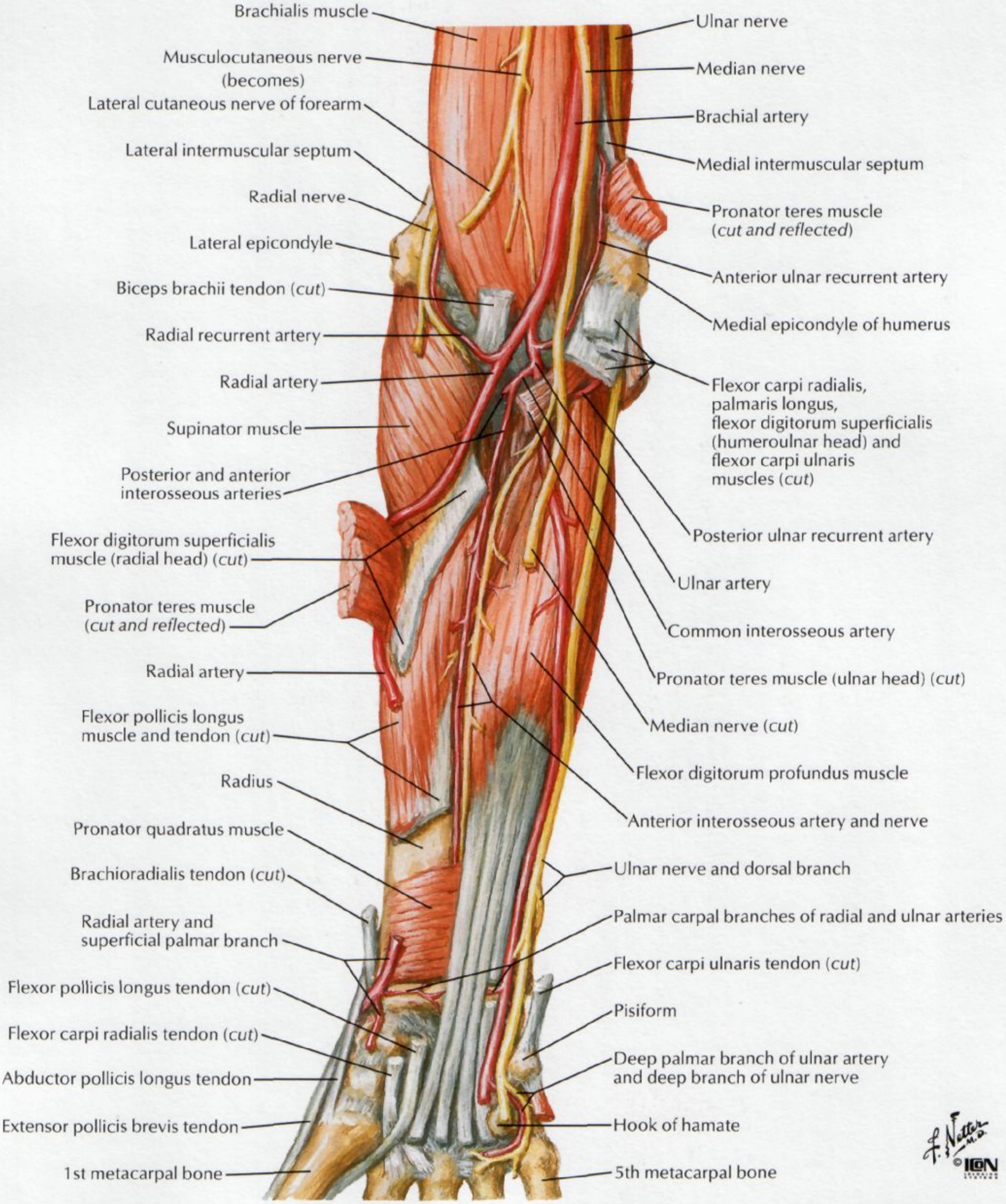
Muscles of Forearm (Deep Layer): Anterior View

SEE ALSO PLATES 458, 459


Brachialis muscle
Musculocutaneous nerve (becomes)
Lateral cutaneous nerve of forearm
Lateral intermuscular septum
Radial nerve
Lateral epicondyle
Biceps brachii tendon (*cut*)
Radial recurrent artery
Radial artery
Supinator muscle
Posterior and anterior interosseous arteries
Flexor digitorum superficialis muscle (radial head) (*cut*)
Pronator teres muscle (*cut and reflected*)
Radial artery
Flexor pollicis longus muscle and tendon (*cut*)
Radius
Pronator quadratus muscle
Brachioradialis tendon (*cut*)
Radial artery and superficial palmar branch
Flexor pollicis longus tendon (*cut*)
Flexor carpi radialis tendon (*cut*)
Abductor pollicis longus tendon
Extensor pollicis brevis tendon
1st metacarpal bone
Ulnar nerve
Median nerve
Brachial artery
Medial intermuscular septum
Pronator teres muscle (*cut and reflected*)
Anterior ulnar recurrent artery
Medial epicondyle of humerus
Flexor carpi radialis, palmaris longus, flexor digitorum superficialis (humeroulnar head) and flexor carpi ulnaris muscles (*cut*)
Posterior ulnar recurrent artery
Ulnar artery
Common interosseous artery
Pronator teres muscle (ulnar head) (*cut*)
Median nerve (*cut*)
Flexor digitorum profundus muscle
Anterior interosseous artery and nerve
Ulnar nerve and dorsal branch
Palmar carpal branches of radial and ulnar arteries
Flexor carpi ulnaris tendon (*cut*)
Pisiform
Deep palmar branch of ulnar artery and deep branch of ulnar nerve
Hook of hamate
5th metacarpal bone
F. Netter M.D.
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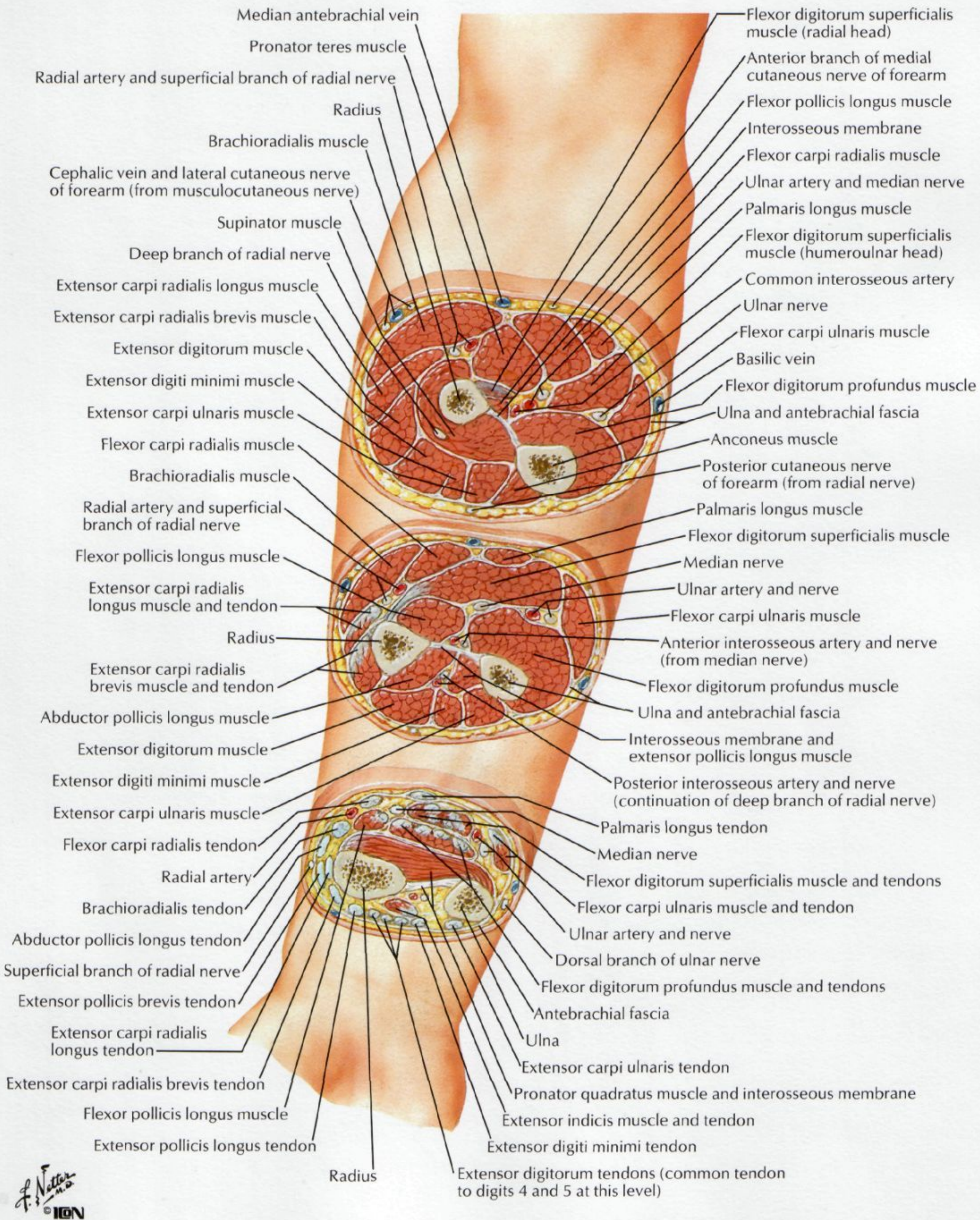
Forearm: Serial Cross Sections


Median antebrachial vein
Pronator teres muscle
Radial artery and superficial branch of radial nerve
Radius
Brachioradialis muscle
Cephalic vein and lateral cutaneous nerve of forearm (from musculocutaneous nerve)
Supinator muscle
Deep branch of radial nerve
Extensor carpi radialis longus muscle
Extensor carpi radialis brevis muscle
Extensor digitorum muscle
Extensor digiti minimi muscle
Extensor carpi ulnaris muscle
Flexor carpi radialis muscle
Brachioradialis muscle
Radial artery and superficial branch of radial nerve
Flexor pollicis longus muscle
Extensor carpi radialis longus muscle and tendon
Radius
Extensor carpi radialis brevis muscle and tendon
Abductor pollicis longus muscle
Extensor digitorum muscle
Extensor digiti minimi muscle
Extensor carpi ulnaris muscle
Flexor carpi radialis tendon
Radial artery
Brachioradialis tendon
Abductor pollicis longus tendon
Superficial branch of radial nerve
Extensor pollicis brevis tendon
Extensor carpi radialis longus tendon
Extensor carpi radialis brevis tendon
Flexor pollicis longus muscle
Extensor pollicis longus tendon
Radius
Flexor digitorum superficialis muscle (radial head)
Anterior branch of medial cutaneous nerve of forearm
Flexor pollicis longus muscle
Interosseous membrane
Flexor carpi radialis muscle
Ulnar artery and median nerve
Palmaris longus muscle
Flexor digitorum superficialis muscle (humeroulnar head)
Common interosseous artery
Ulnar nerve
Flexor carpi ulnaris muscle
Basilic vein
Flexor digitorum profundus muscle
Ulna and antebrachial fascia
Anconeus muscle
Posterior cutaneous nerve of forearm (from radial nerve)
Palmaris longus muscle
Flexor digitorum superficialis muscle
Median nerve
Ulnar artery and nerve
Flexor carpi ulnaris muscle
Anterior interosseous artery and nerve (from median nerve)
Flexor digitorum profundus muscle
Ulna and antebrachial fascia
Interosseous membrane and extensor pollicis longus muscle
Posterior interosseous artery and nerve (continuation of deep branch of radial nerve)
Palmaris longus tendon
Median nerve
Flexor digitorum superficialis muscle and tendons
Flexor carpi ulnaris muscle and tendon
Ulnar artery and nerve
Dorsal branch of ulnar nerve
Flexor digitorum profundus muscle and tendons
Antebrachial fascia
Ulna
Extensor carpi ulnaris tendon
Pronator quadratus muscle and interosseous membrane
Extensor indicis muscle and tendon
Extensor digiti minimi tendon
Extensor digitorum tendons (common tendon to digits 4 and 5 at this level)
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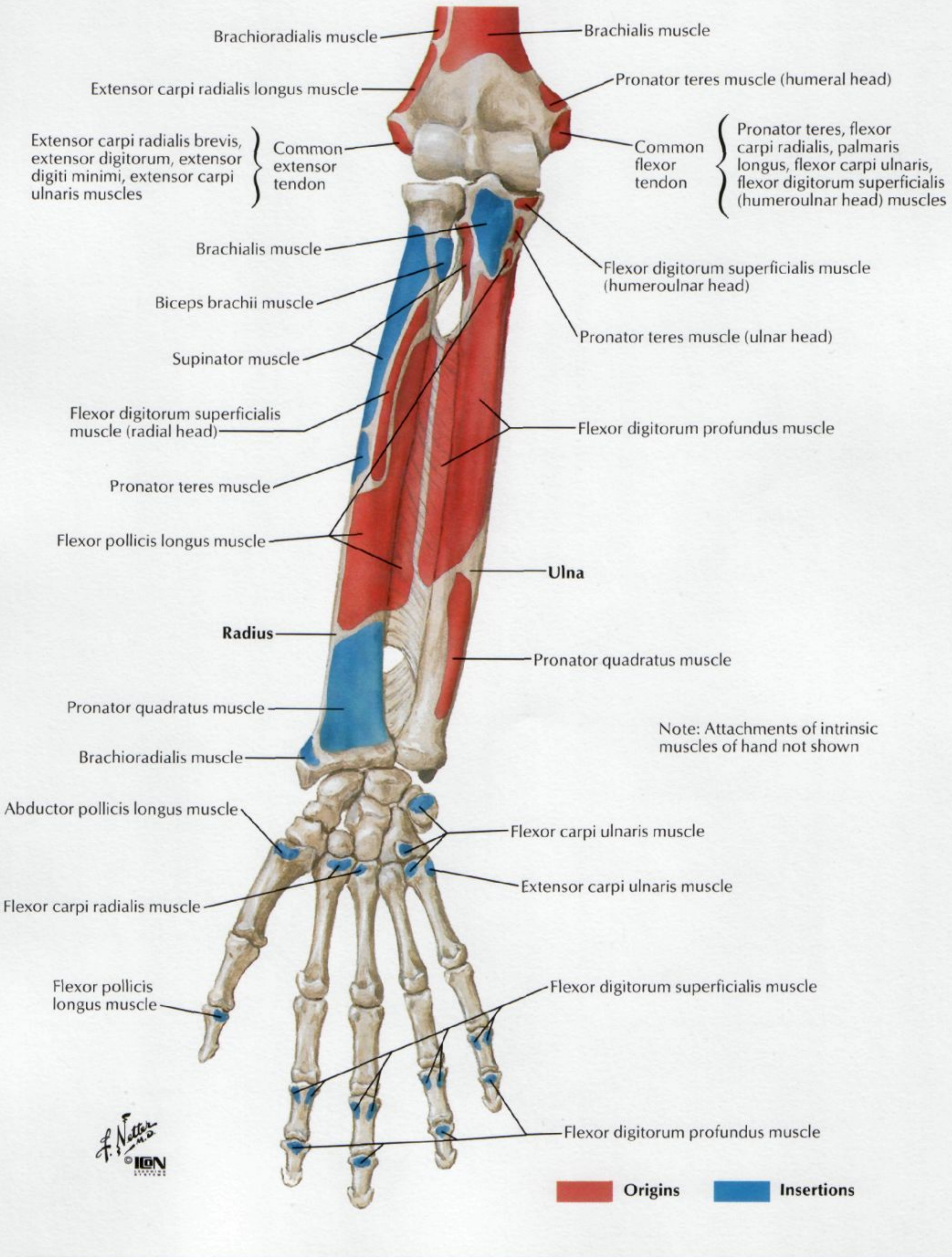
Attachments of Muscles of Forearm: Anterior View


Brachioradialis muscle
Brachialis muscle
Extensor carpi radialis longus muscle
Pronator teres muscle (humeral head)
Extensor carpi radialis brevis, extensor digitorum, extensor digiti minimi, extensor carpi ulnaris muscles
Common extensor tendon
Common flexor tendon
Pronator teres, flexor carpi radialis, palmaris longus, flexor carpi ulnaris, flexor digitorum superficialis (humeroulnar head) muscles
Brachialis muscle
Flexor digitorum superficialis muscle (humeroulnar head)
Biceps brachii muscle
Pronator teres muscle (ulnar head)
Supinator muscle
Flexor digitorum superficialis muscle (radial head)
Flexor digitorum profundus muscle
Pronator teres muscle
Flexor pollicis longus muscle
Ulna
Radius
Pronator quadratus muscle
Pronator quadratus muscle
Note: Attachments of intrinsic muscles of hand not shown
Brachioradialis muscle
Abductor pollicis longus muscle
Flexor carpi ulnaris muscle
Extensor carpi ulnaris muscle
Flexor carpi radialis muscle
Flexor pollicis longus muscle
Flexor digitorum superficialis muscle
Flexor digitorum profundus muscle
F. Netter M.D.
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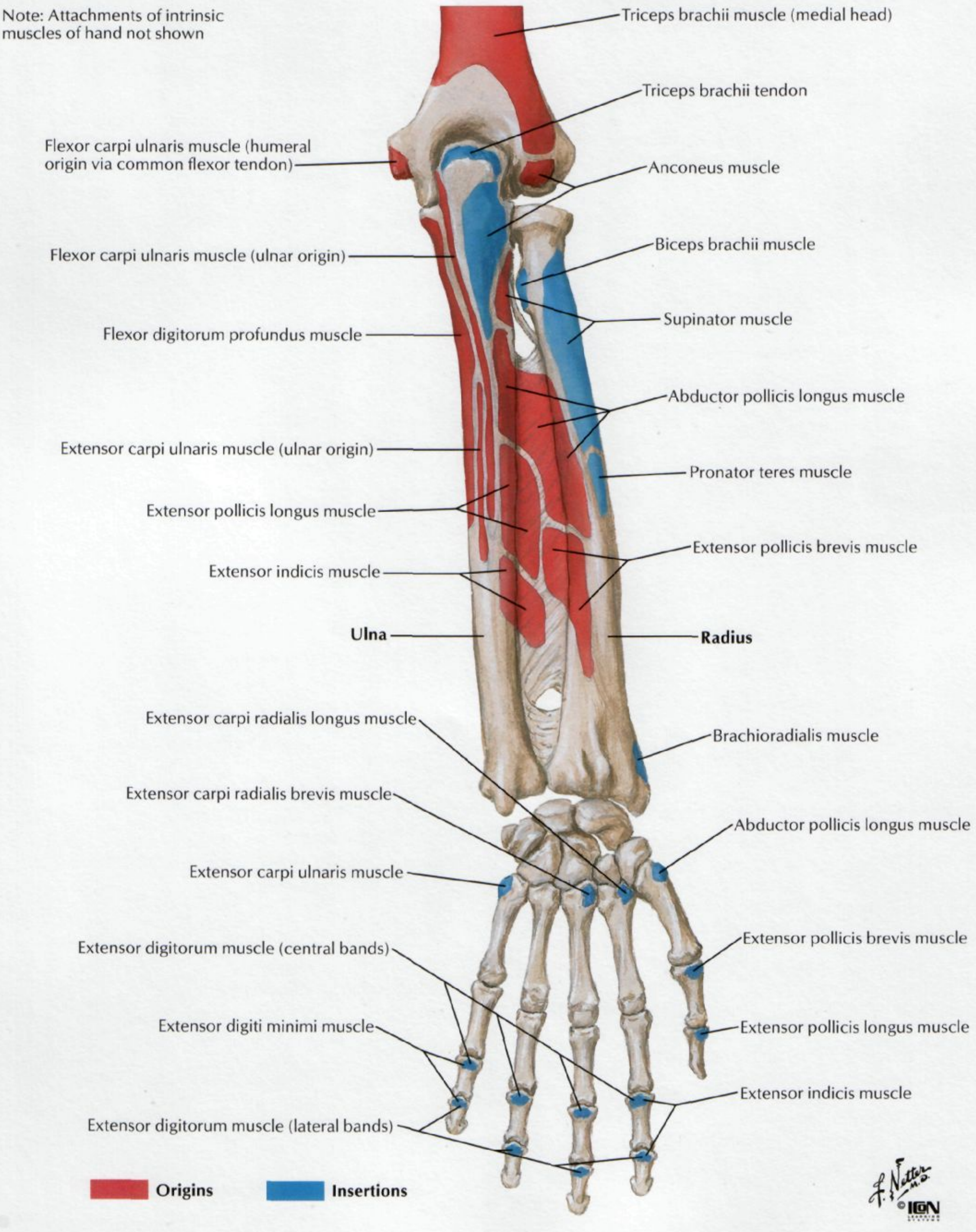
🟥 Origins
🟦 Insertions

Attachments of Muscles of Forearm: Posterior View


Note: Attachments of intrinsic muscles of hand not shown

Triceps brachii muscle (medial head)
Triceps brachii tendon
Flexor carpi ulnaris muscle (humeral origin via common flexor tendon)
Anconeus muscle
Flexor carpi ulnaris muscle (ulnar origin)
Biceps brachii muscle
Supinator muscle
Flexor digitorum profundus muscle
Abductor pollicis longus muscle
Extensor carpi ulnaris muscle (ulnar origin)
Pronator teres muscle
Extensor pollicis longus muscle
Extensor pollicis brevis muscle
Extensor indicis muscle
Ulna
Radius
Extensor carpi radialis longus muscle
Brachioradialis muscle
Extensor carpi radialis brevis muscle
Abductor pollicis longus muscle
Extensor carpi ulnaris muscle
Extensor digitorum muscle (central bands)
Extensor pollicis brevis muscle
Extensor digiti minimi muscle
Extensor pollicis longus muscle
Extensor indicis muscle
Extensor digitorum muscle (lateral bands)
🟥 Origins
🟦 Insertions
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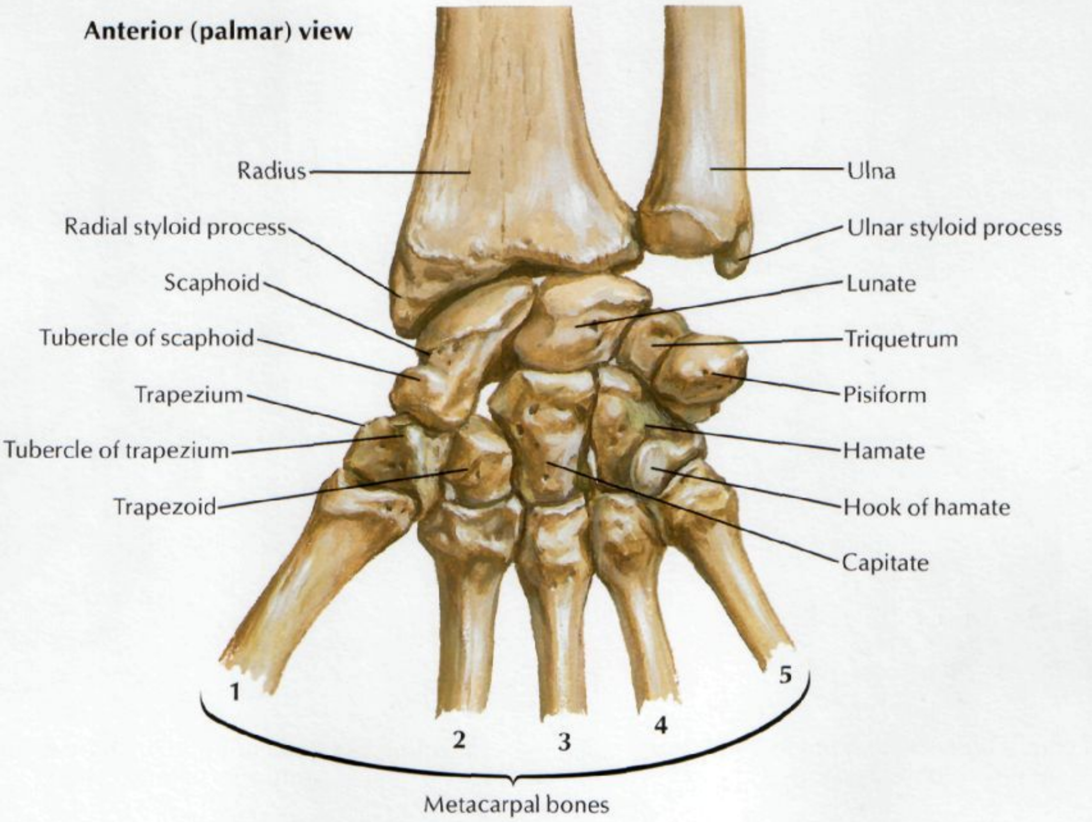
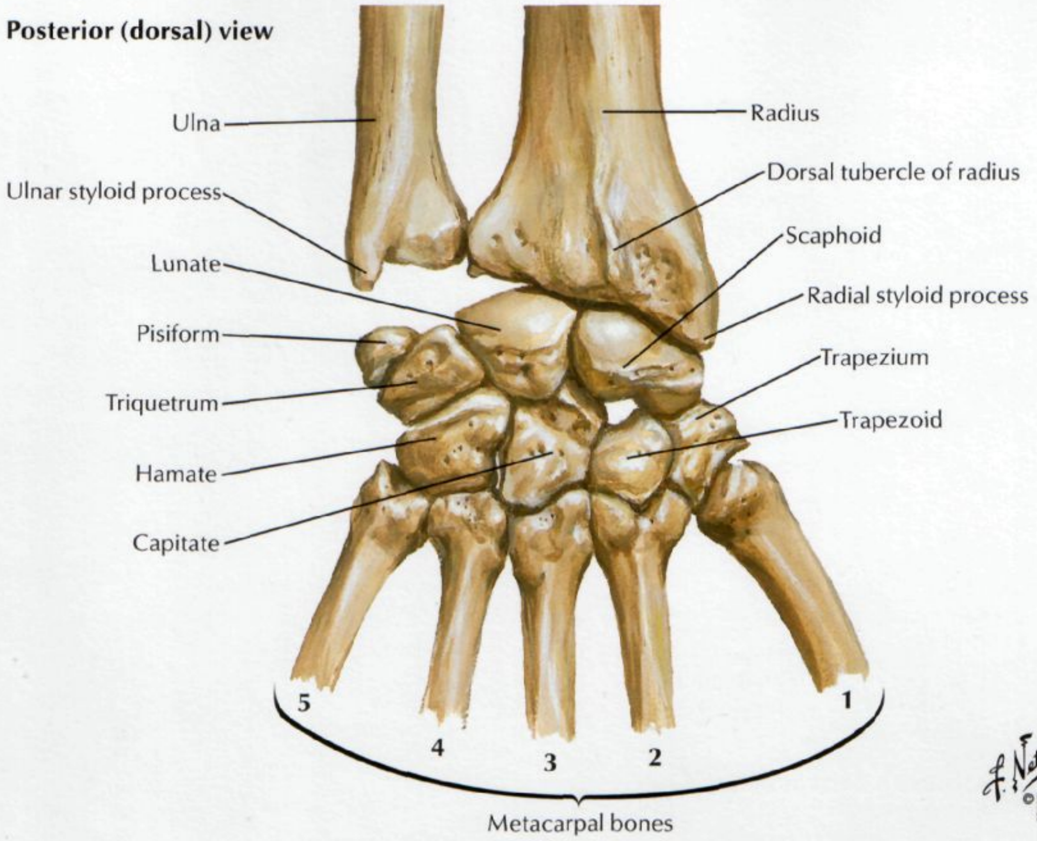
Carpal Bones

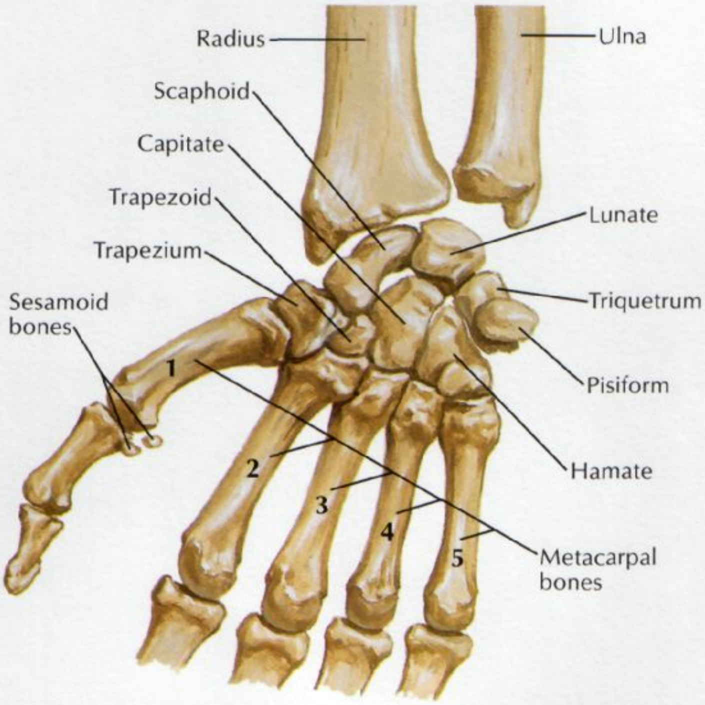
Anterior (palmar) view



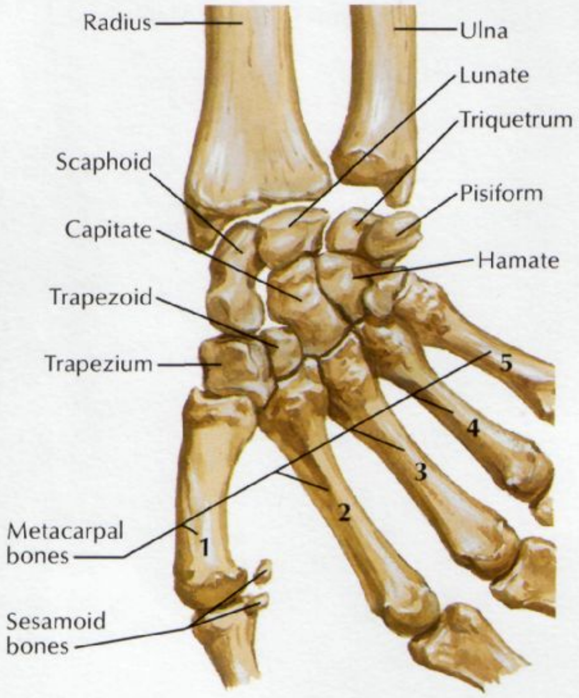
Posterior (dorsal) view



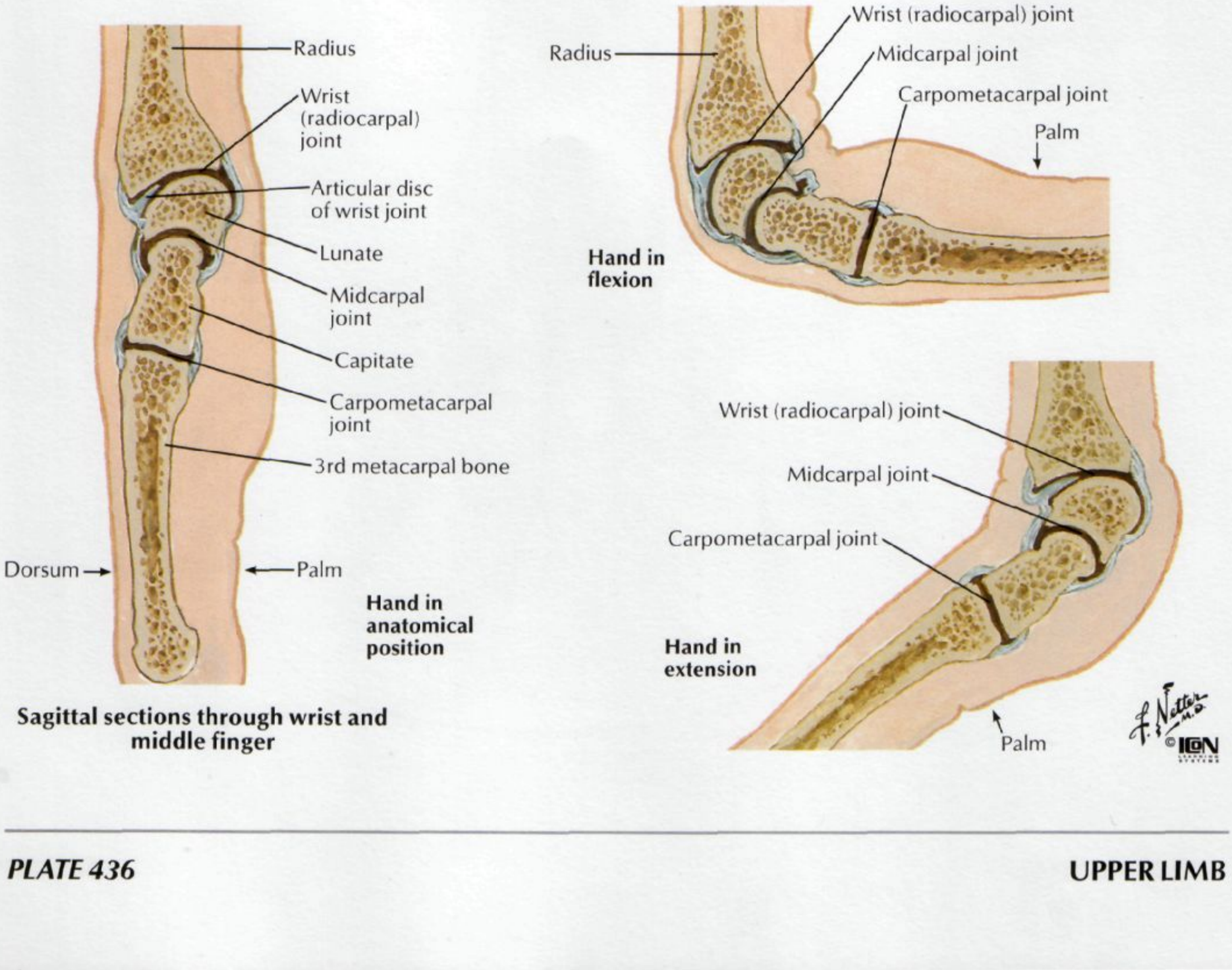
Movements of Wrist



Position of carpal bones with hand in abduction: anterior (palmar) view



Position of carpal bones with hand in adduction: anterior (palmar) view



Hand in anatomical position

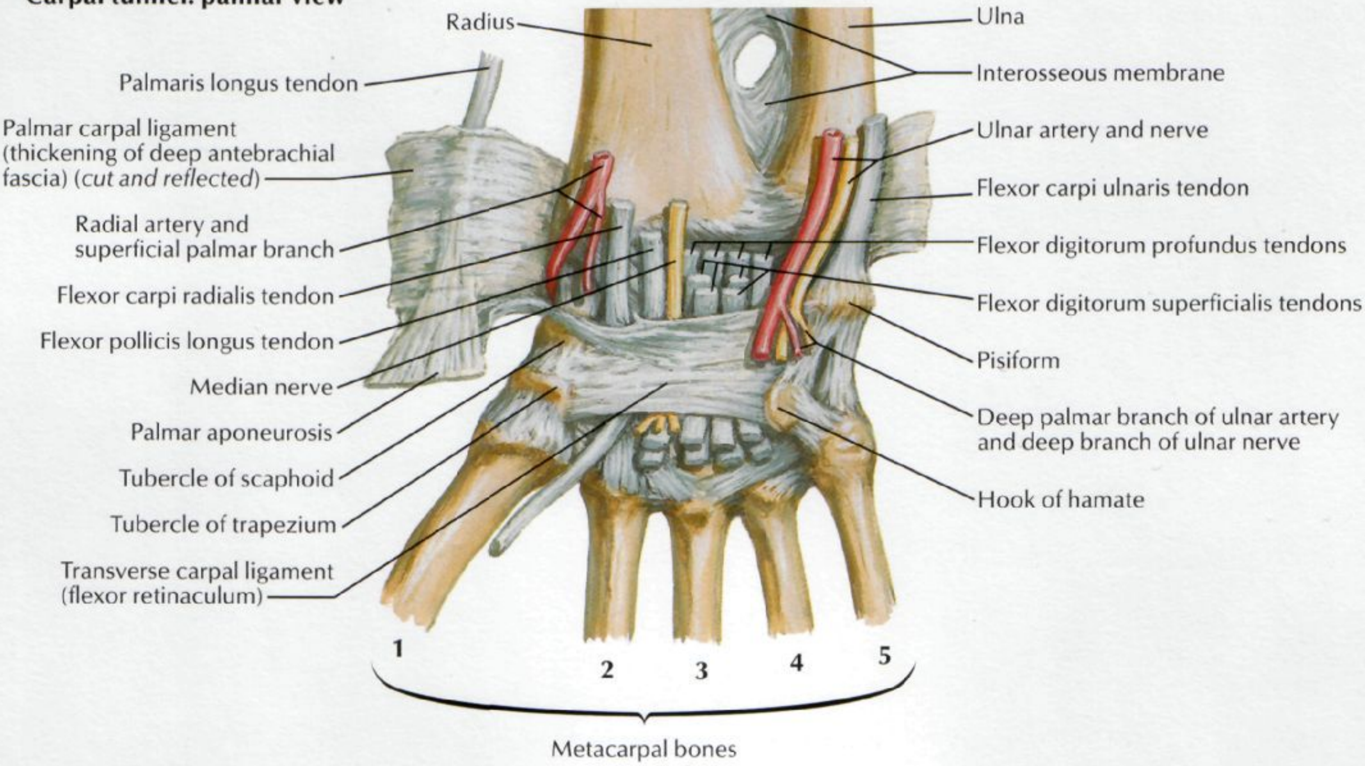
Hand in flexion

Hand in extension

Sagittal sections through wrist and middle finger

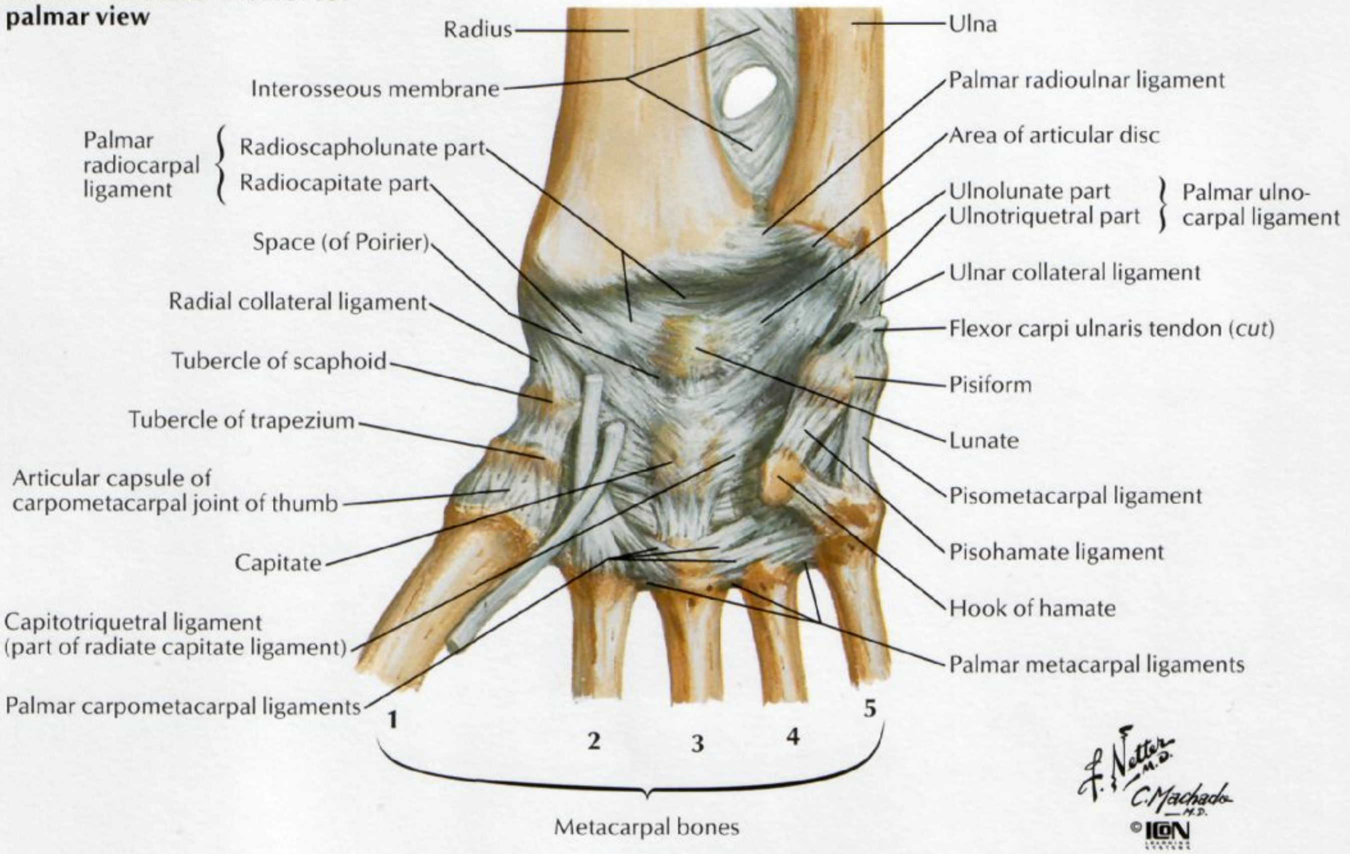
Ligaments of Wrist

Carpal tunnel: palmar view



Radius
Ulna
Interosseous membrane
Palmaris longus tendon
Ulnar artery and nerve
Palmar carpal ligament (thickening of deep antebrachial fascia) (*cut and reflected*)
Flexor carpi ulnaris tendon
Radial artery and superficial palmar branch
Flexor digitorum profundus tendons
Flexor carpi radialis tendon
Flexor digitorum superficialis tendons
Flexor pollicis longus tendon
Pisiform
Median nerve
Palmar aponeurosis
Deep palmar branch of ulnar artery and deep branch of ulnar nerve
Tubercle of scaphoid
Hook of hamate
Tubercle of trapezium
Transverse carpal ligament (flexor retinaculum)
1
2
3
4
5
Metacarpal bones

Flexor retinaculum removed: palmar view



Radius
Ulna
Interosseous membrane
Palmar radioulnar ligament
Palmar radiocarpal ligament
Radioscapholunate part
Radiocapitate part
Area of articular disc
Ulnolunate part
Ulnotriquetral part
Palmar ulnocarpal ligament
Space (of Poirier)
Ulnar collateral ligament
Radial collateral ligament
Flexor carpi ulnaris tendon (*cut*)
Tubercle of scaphoid
Pisiform
Tubercle of trapezium
Lunate
Articular capsule of carpometacarpal joint of thumb
Pisometacarpal ligament
Capitate
Pisohamate ligament
Hook of hamate
Capitotriquetral ligament (part of radiate capitate ligament)
Palmar metacarpal ligaments
Palmar carpometacarpal ligaments
1
2
3
4
5
Metacarpal bones
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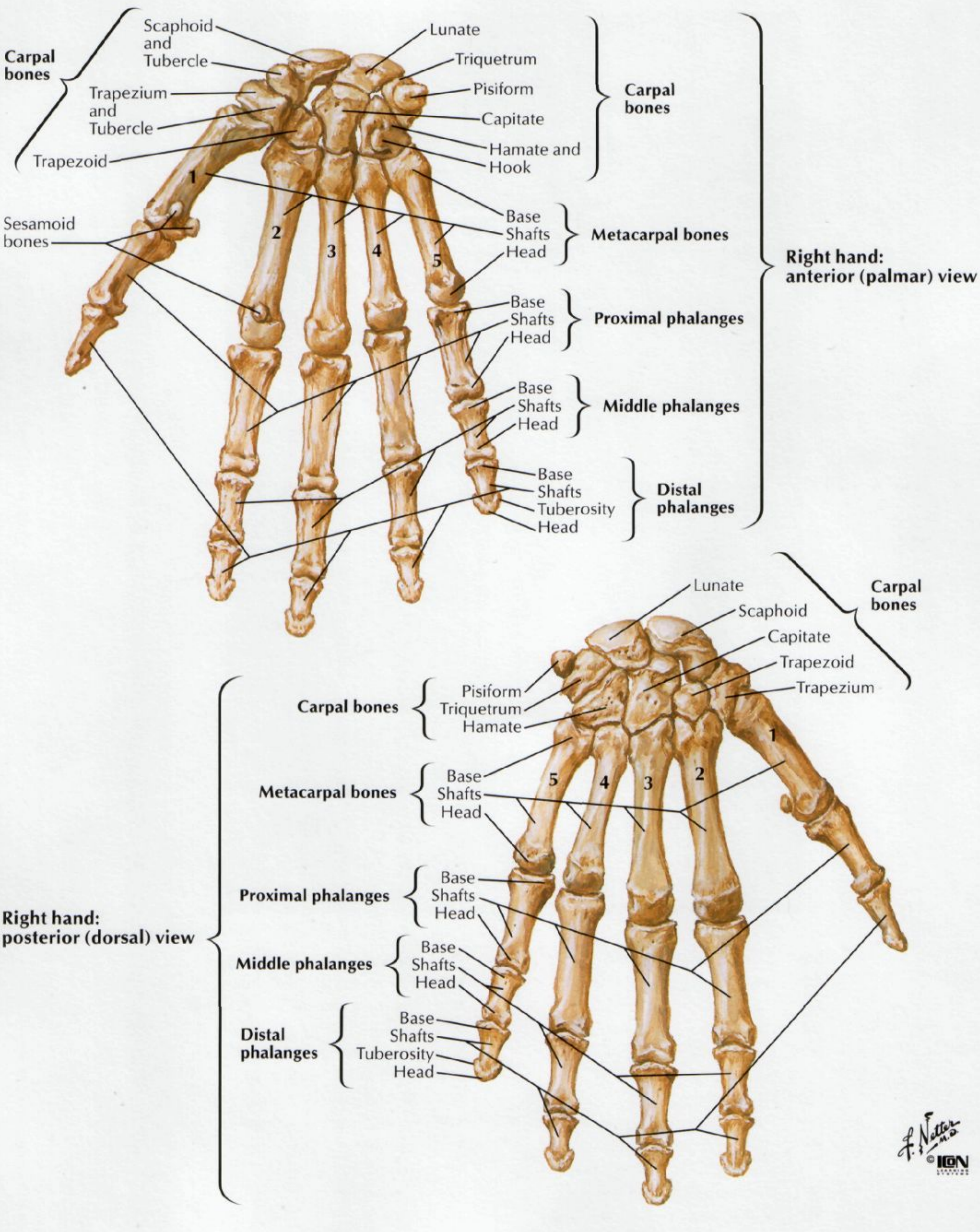
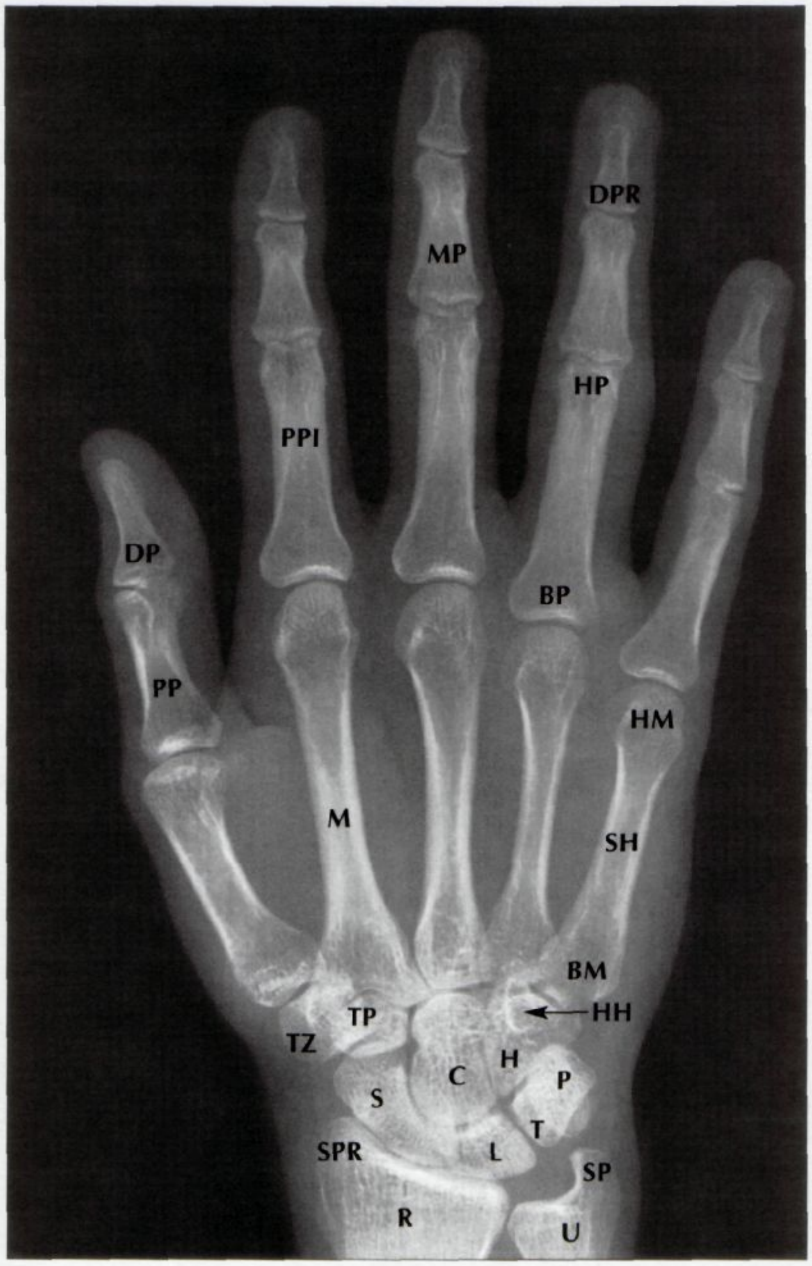
Bones of Wrist and Hand



Wrist and Hand: Anteroposterior Radiograph

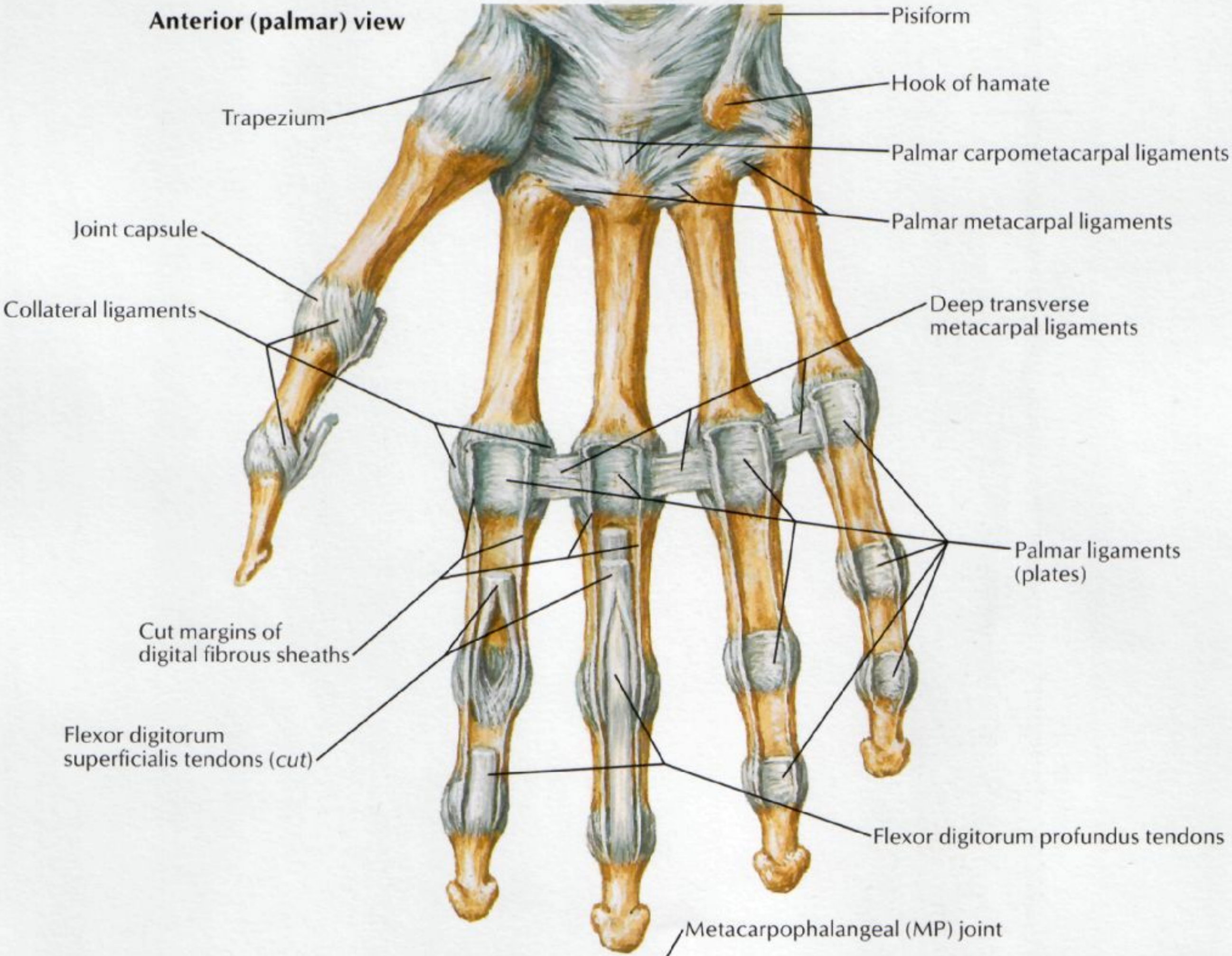
SEE ALSO PLATE 439



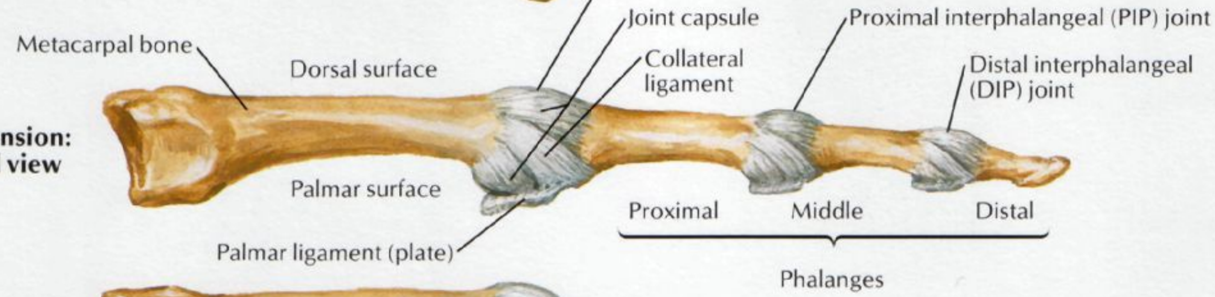
BM	Base of 5th metacarpal
BP	Base of 4th proximal phalanx
C	Capitate
DP	Distal phalanx of thumb
DPR	Distal phalanx of ring finger
H	Hamate
HH	Hook of hamate
HM	Head of 5th metacarpal
HP	Head of proximal phalanx
L	Lunate
M	Metacarpal of index finger
MP	Middle phalanx of middle finger
P	Pisiform
PP	Proximal phalanx of thumb
PPI	Proximal phalanx of index finger
R	Radius
S	Scaphoid
SH	Shaft of 5th metacarpal
SP	Styloid process of ulna
SPR	Styloid process of radius
T	Triquetrum
TP	Trapezoid
TZ	Trapezium
U	Ulna

Metacarpophalangeal and Interphalangeal Ligaments

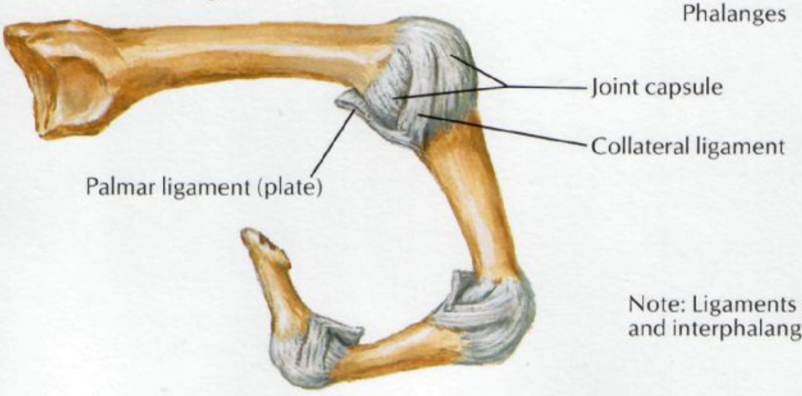
Anterior (palmar) view


Pisiform
Hook of hamate
Trapezium
Palmar carpometacarpal ligaments
Palmar metacarpal ligaments
Joint capsule
Collateral ligaments
Deep transverse metacarpal ligaments
Palmar ligaments (plates)
Cut margins of digital fibrous sheaths
Flexor digitorum superficialis tendons (*cut*)
Flexor digitorum profundus tendons

In extension: medial view

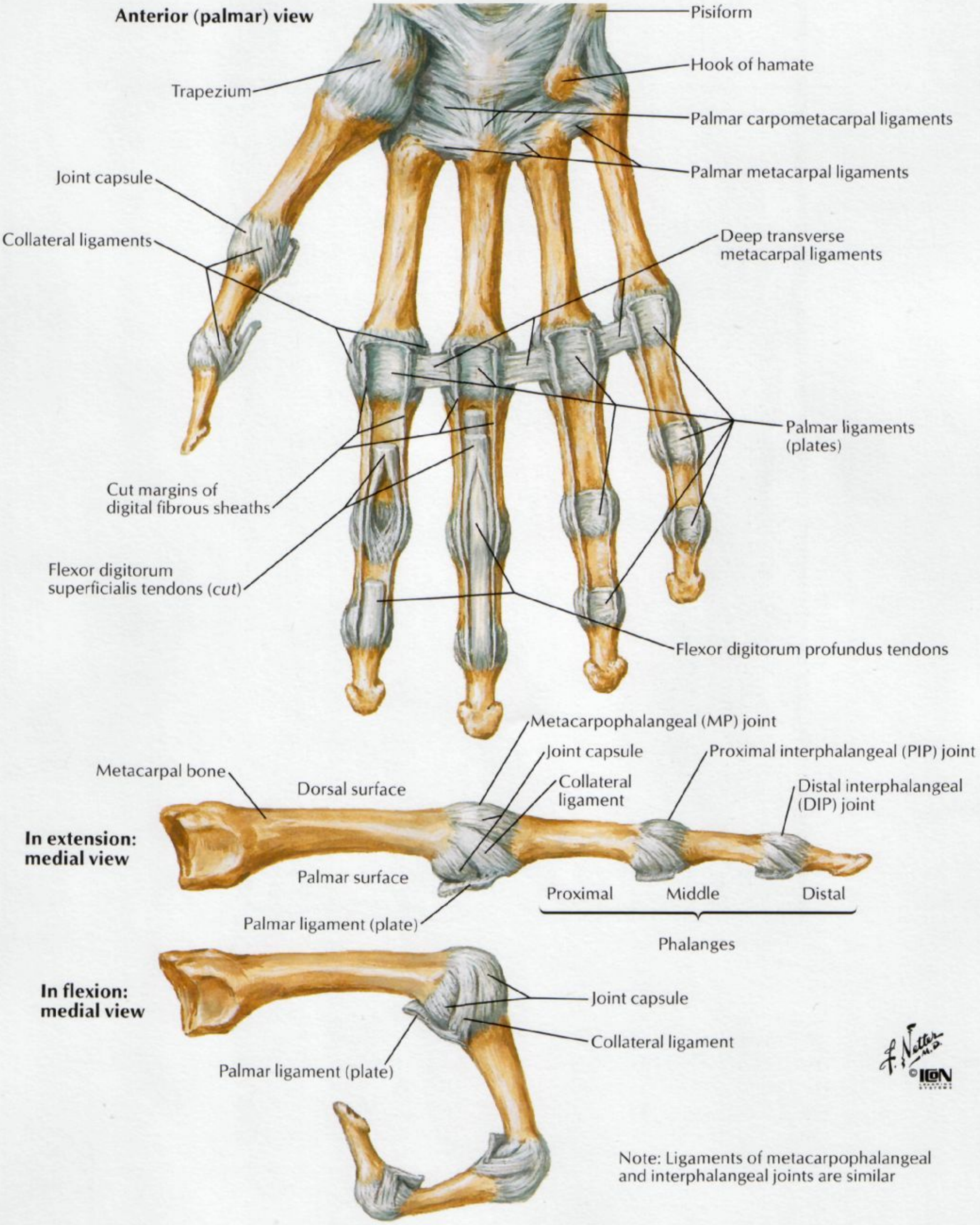


In flexion: medial view



Note: Ligaments of metacarpophalangeal and interphalangeal joints are similar

Metacarpophalangeal and Interphalangeal Ligaments



Anterior (palmar) view
Pisiform
Trapezium
Hook of hamate
Palmar carpometacarpal ligaments
Palmar metacarpal ligaments
Joint capsule
Collateral ligaments
Deep transverse metacarpal ligaments
Palmar ligaments (plates)
Cut margins of digital fibrous sheaths
Flexor digitorum superficialis tendons (*cut*)
Flexor digitorum profundus tendons
Metacarpophalangeal (MP) joint
Joint capsule
Proximal interphalangeal (PIP) joint
Metacarpal bone
Dorsal surface
Collateral ligament
Distal interphalangeal (DIP) joint
In extension: medial view
Palmar surface
Proximal
Middle
Distal
Phalanges
Palmar ligament (plate)
In flexion: medial view
Joint capsule
Collateral ligament
Palmar ligament (plate)
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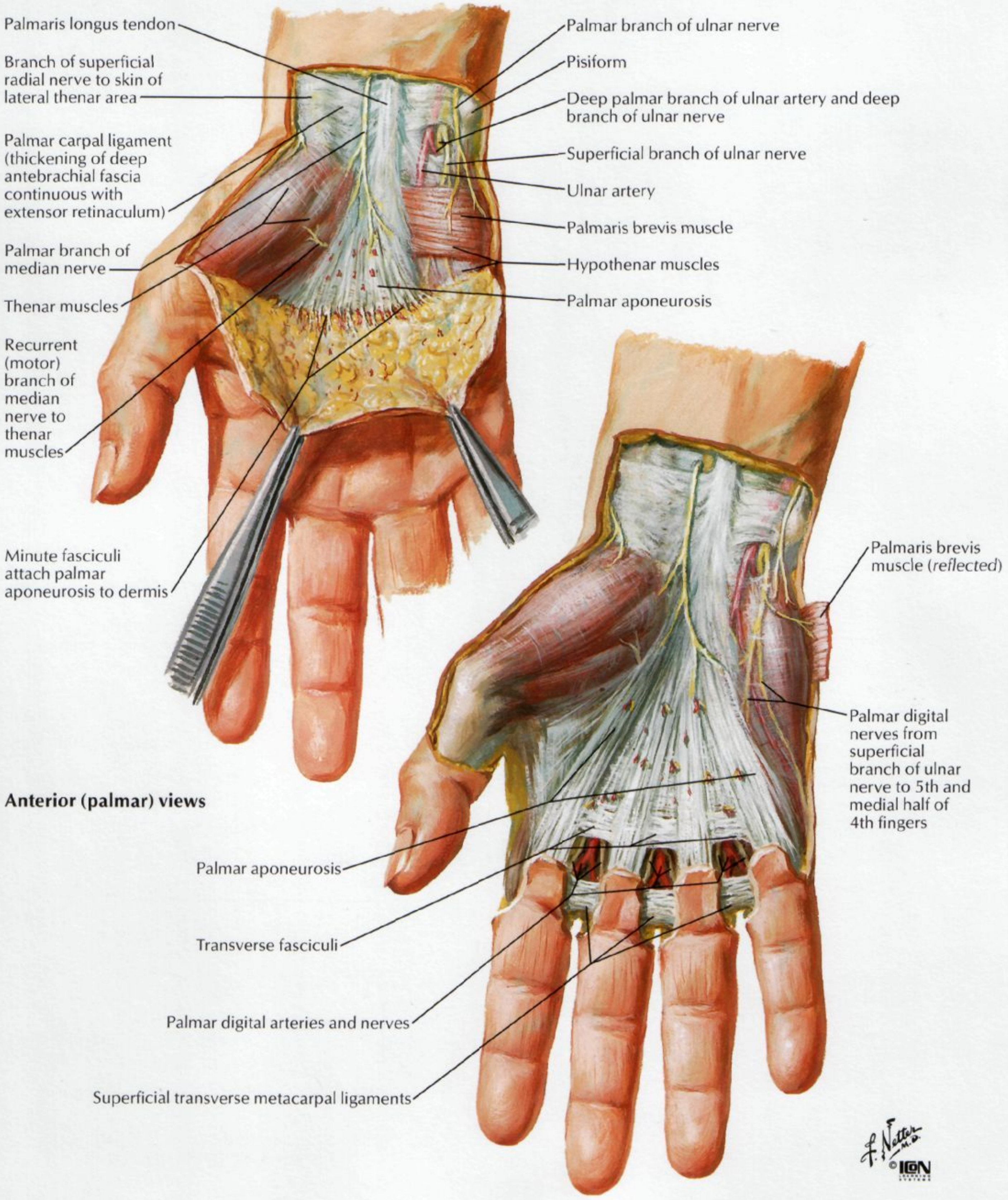
Note: Ligaments of metacarpophalangeal and interphalangeal joints are similar

Wrist and Hand: Superficial Palmar Dissections


Anterior (palmar) views

Palmaris longus tendon
Branch of superficial radial nerve to skin of lateral thenar area
Palmar carpal ligament (thickening of deep antebrachial fascia continuous with extensor retinaculum)
Palmar branch of median nerve
Thenar muscles
Recurrent (motor) branch of median nerve to thenar muscles
Minute fasciculi attach palmar aponeurosis to dermis
Palmar branch of ulnar nerve
Pisiform
Deep palmar branch of ulnar artery and deep branch of ulnar nerve
Superficial branch of ulnar nerve
Ulnar artery
Palmaris brevis muscle
Hypothenar muscles
Palmar aponeurosis
Palmaris brevis muscle (*reflected*)
Palmar digital nerves from superficial branch of ulnar nerve to 5th and medial half of 4th fingers
Palmar aponeurosis
Transverse fasciculi
Palmar digital arteries and nerves
Superficial transverse metacarpal ligaments
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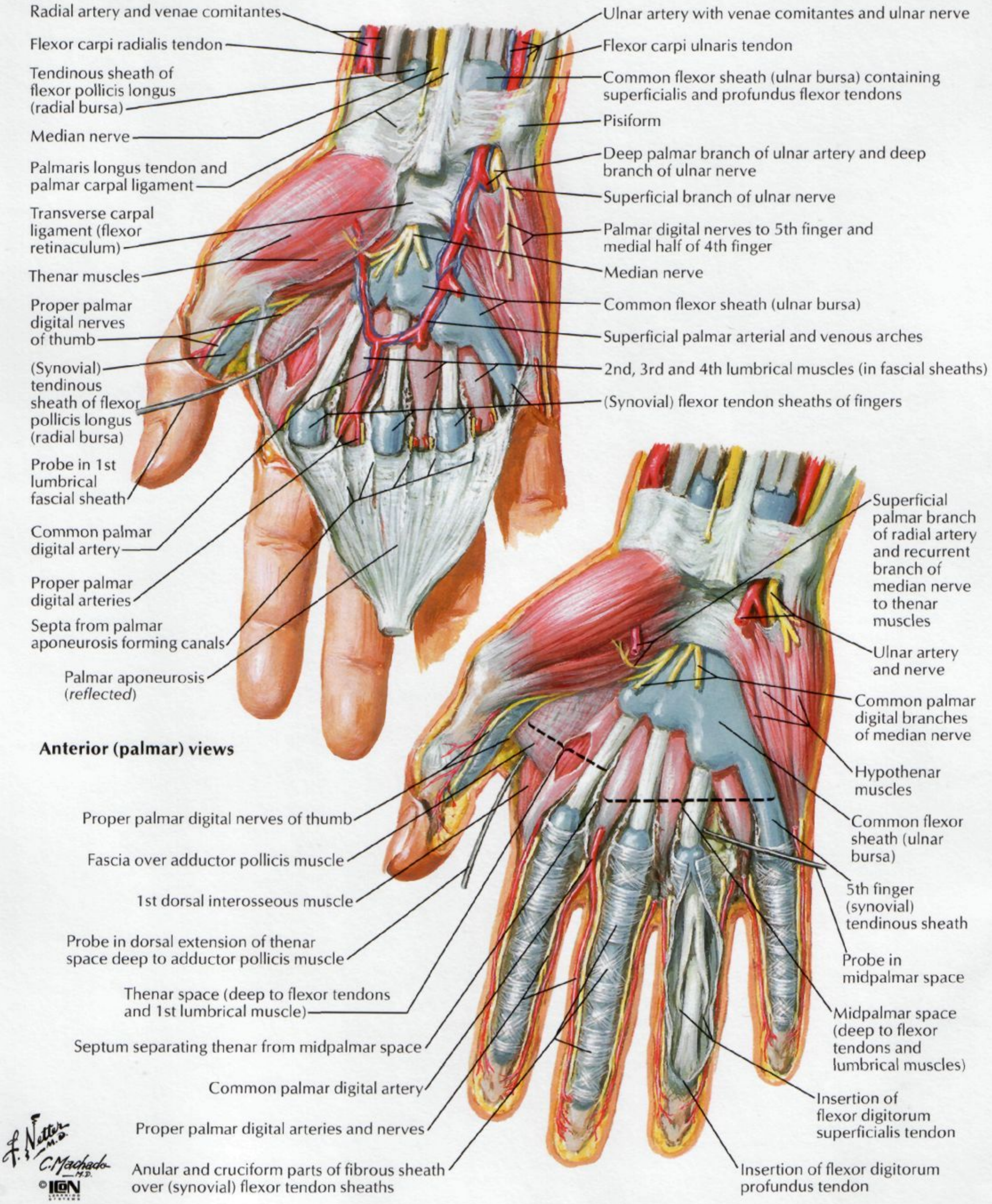
Wrist and Hand: Deeper Palmar Dissections


Radial artery and venae comitantes
Flexor carpi radialis tendon
Tendinous sheath of flexor pollicis longus (radial bursa)
Median nerve
Palmaris longus tendon and palmar carpal ligament
Transverse carpal ligament (flexor retinaculum)
Thenar muscles
Proper palmar digital nerves of thumb
(Synovial) tendinous sheath of flexor pollicis longus (radial bursa)
Probe in 1st lumbrical fascial sheath
Common palmar digital artery
Proper palmar digital arteries
Septa from palmar aponeurosis forming canals
Palmar aponeurosis (*reflected*)
Ulnar artery with venae comitantes and ulnar nerve
Flexor carpi ulnaris tendon
Common flexor sheath (ulnar bursa) containing superficialis and profundus flexor tendons
Pisiform
Deep palmar branch of ulnar artery and deep branch of ulnar nerve
Superficial branch of ulnar nerve
Palmar digital nerves to 5th finger and medial half of 4th finger
Median nerve
Common flexor sheath (ulnar bursa)
Superficial palmar arterial and venous arches
2nd, 3rd and 4th lumbrical muscles (in fascial sheaths)
(Synovial) flexor tendon sheaths of fingers
Proper palmar digital nerves of thumb
Fascia over adductor pollicis muscle
1st dorsal interosseous muscle
Probe in dorsal extension of thenar space deep to adductor pollicis muscle
Thenar space (deep to flexor tendons and 1st lumbrical muscle)
Septum separating thenar from midpalmar space
Common palmar digital artery
Proper palmar digital arteries and nerves
Anular and cruciform parts of fibrous sheath over (synovial) flexor tendon sheaths
Superficial palmar branch of radial artery and recurrent branch of median nerve to thenar muscles
Ulnar artery and nerve
Common palmar digital branches of median nerve
Hypothenar muscles
Common flexor sheath (ulnar bursa)
5th finger (synovial) tendinous sheath
Probe in midpalmar space
Midpalmar space (deep to flexor tendons and lumbrical muscles)
Insertion of flexor digitorum superficialis tendon
Insertion of flexor digitorum profundus tendon
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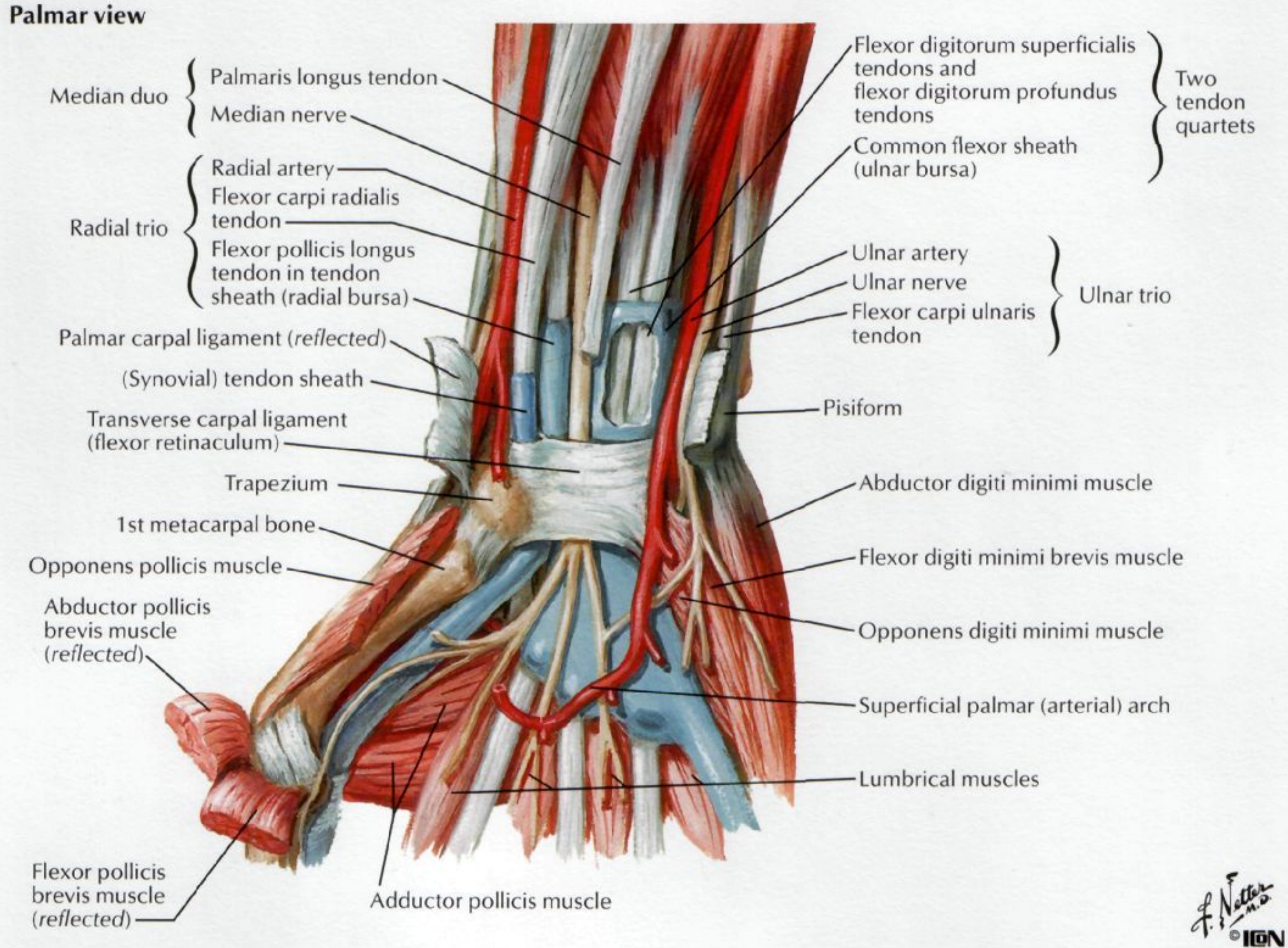
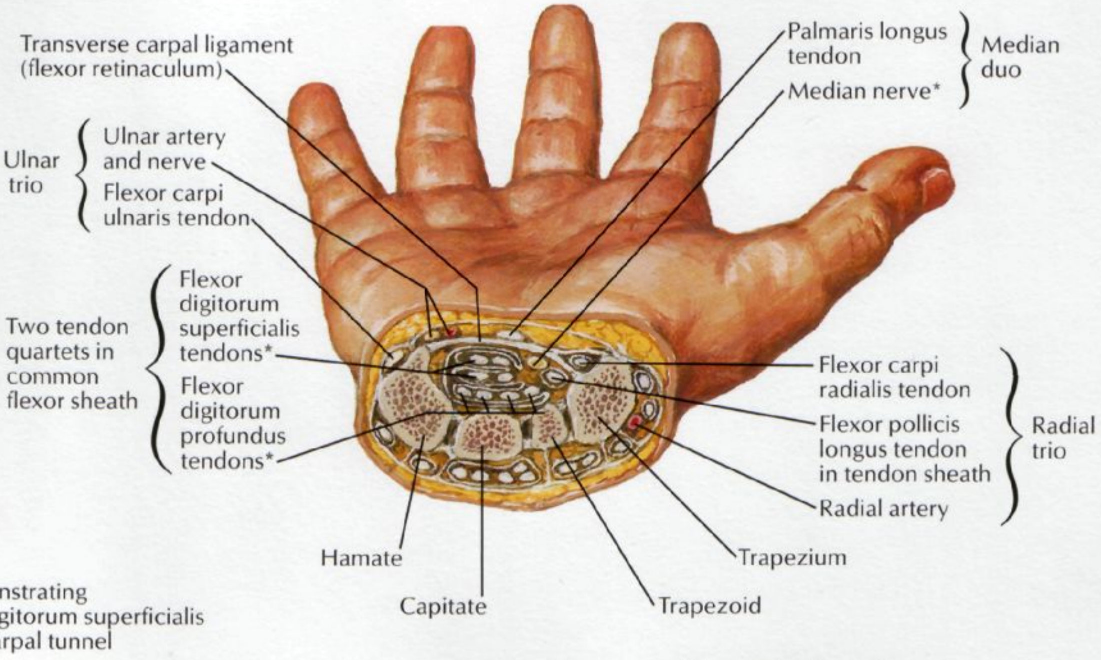
Anterior (palmar) views

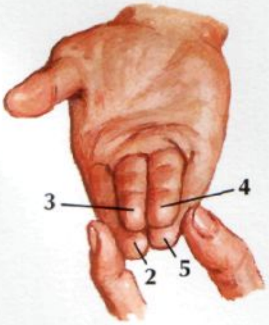
Flexor Tendons, Arteries and Nerves at Wrist

Palmar view


Median duo
Palmaris longus tendon
Median nerve
Radial trio
Radial artery
Flexor carpi radialis tendon
Flexor pollicis longus tendon in tendon sheath (radial bursa)
Palmar carpal ligament (*reflected*)
(Synovial) tendon sheath
Transverse carpal ligament (flexor retinaculum)
Trapezium
1st metacarpal bone
Opponens pollicis muscle
Abductor pollicis brevis muscle (*reflected*)
Flexor pollicis brevis muscle (*reflected*)
Adductor pollicis muscle
Flexor digitorum superficialis tendons and flexor digitorum profundus tendons
Common flexor sheath (ulnar bursa)
Two tendon quartets
Ulnar artery
Ulnar nerve
Flexor carpi ulnaris tendon
Ulnar trio
Pisiform
Abductor digiti minimi muscle
Flexor digiti minimi brevis muscle
Opponens digiti minimi muscle
Superficial palmar (arterial) arch
Lumbrical muscles

Transverse cross section of wrist demonstrating carpal tunnel

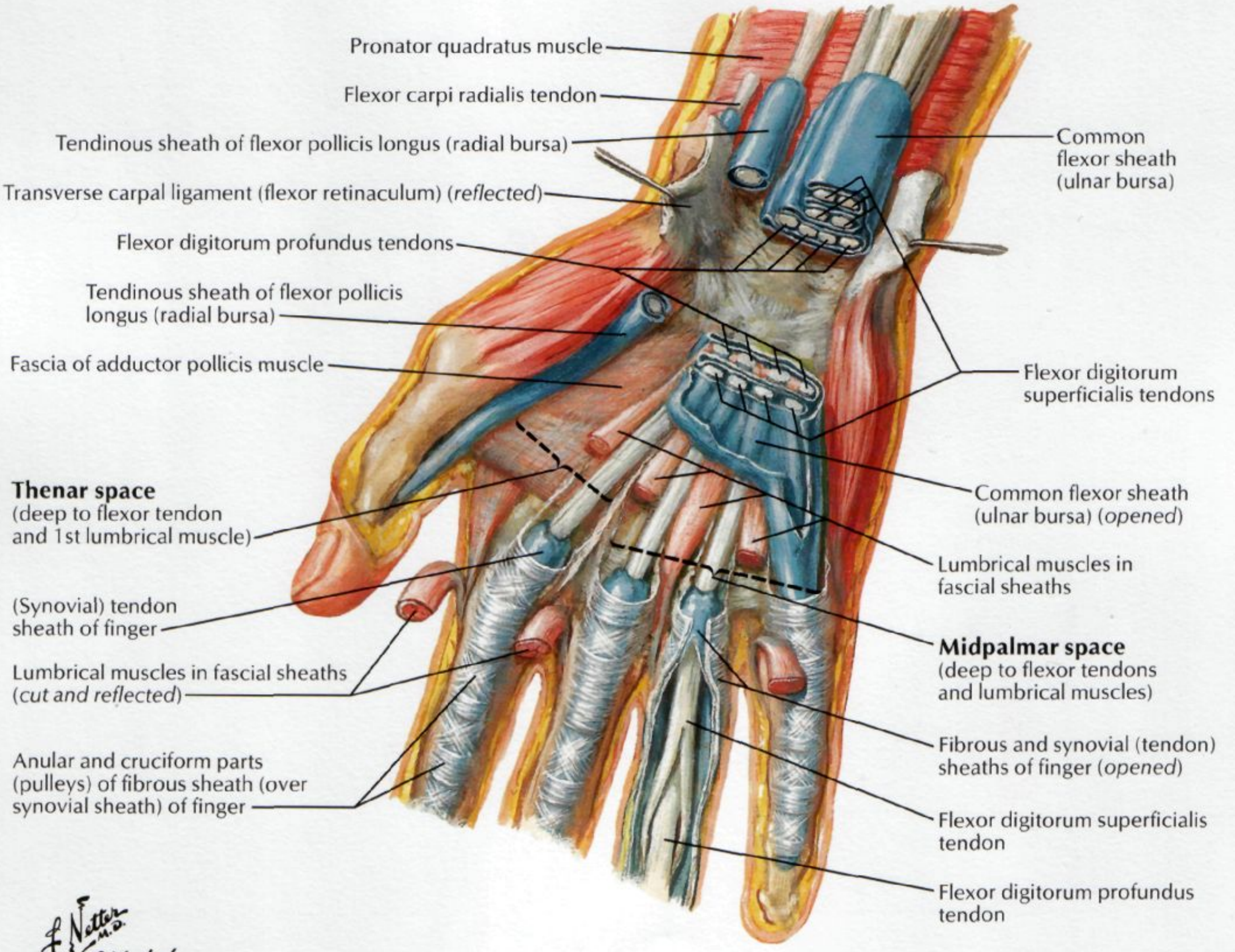

Transverse carpal ligament (flexor retinaculum)
Ulnar trio
Ulnar artery and nerve
Flexor carpi ulnaris tendon
Two tendon quartets in common flexor sheath
Flexor digitorum superficialis tendons*
Flexor digitorum profundus tendons*
Hamate
Capitate
Trapezoid
Trapezium
Palmaris longus tendon
Median nerve*
Median duo
Flexor carpi radialis tendon
Flexor pollicis longus tendon in tendon sheath
Radial artery
Radial trio

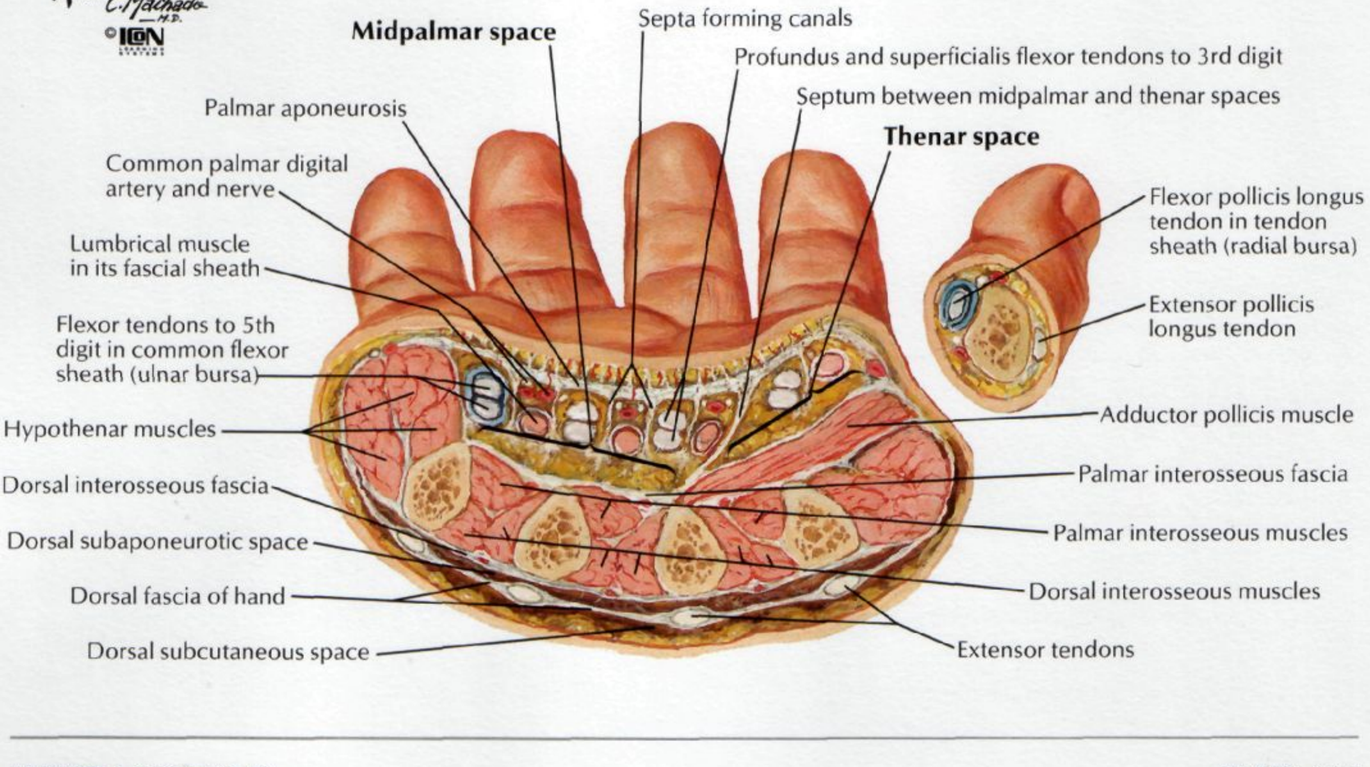


Simple method of demonstrating arrangement of flexor digitorum superficialis tendon quartet within carpal tunnel

*Contents of carpal tunnel

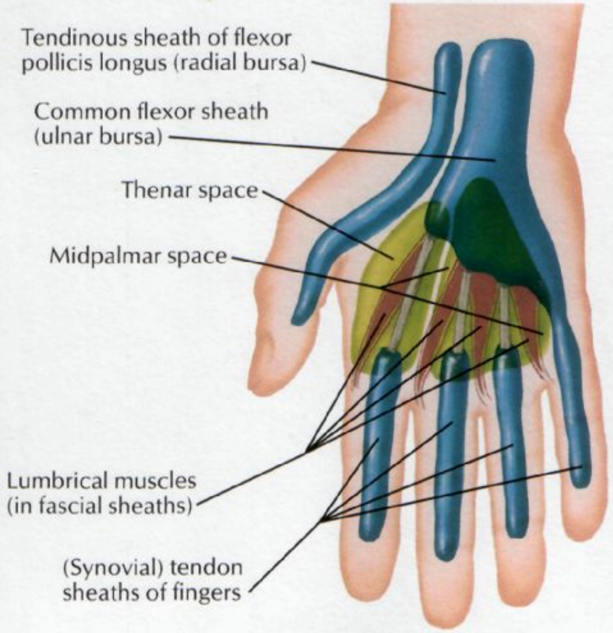
Bursae, Spaces and Tendon Sheaths of Hand


Pronator quadratus muscle
Flexor carpi radialis tendon
Tendinous sheath of flexor pollicis longus (radial bursa)
Transverse carpal ligament (flexor retinaculum) (*reflected*)
Flexor digitorum profundus tendons
Tendinous sheath of flexor pollicis longus (radial bursa)
Fascia of adductor pollicis muscle
Thenar space
(deep to flexor tendon and 1st lumbrical muscle)
(Synovial) tendon sheath of finger
Lumbrical muscles in fascial sheaths (*cut and reflected*)
Anular and cruciform parts (pulleys) of fibrous sheath (over synovial sheath) of finger
Common flexor sheath (ulnar bursa)
Flexor digitorum superficialis tendons
Common flexor sheath (ulnar bursa) (*opened*)
Lumbrical muscles in fascial sheaths
Midpalmar space
(deep to flexor tendons and lumbrical muscles)
Fibrous and synovial (tendon) sheaths of finger (*opened*)
Flexor digitorum superficialis tendon
Flexor digitorum profundus tendon

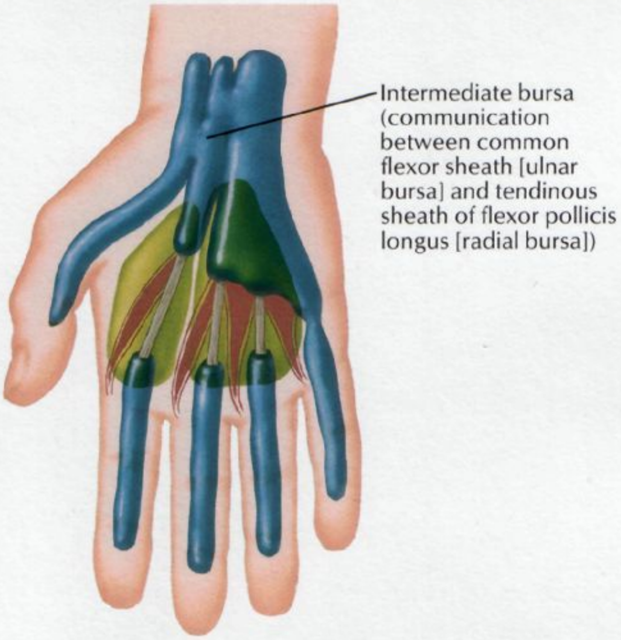

Midpalmar space
Septa forming canals
Profundus and superficialis flexor tendons to 3rd digit
Septum between midpalmar and thenar spaces
Thenar space
Palmar aponeurosis
Common palmar digital artery and nerve
Lumbrical muscle in its fascial sheath
Flexor tendons to 5th digit in common flexor sheath (ulnar bursa)
Hypothenar muscles
Dorsal interosseous fascia
Dorsal subaponeurotic space
Dorsal fascia of hand
Dorsal subcutaneous space
Flexor pollicis longus tendon in tendon sheath (radial bursa)
Extensor pollicis longus tendon
Adductor pollicis muscle
Palmar interosseous fascia
Palmar interosseous muscles
Dorsal interosseous muscles
Extensor tendons

Lumbrical Muscles and Bursae, Spaces and Sheaths: Schema

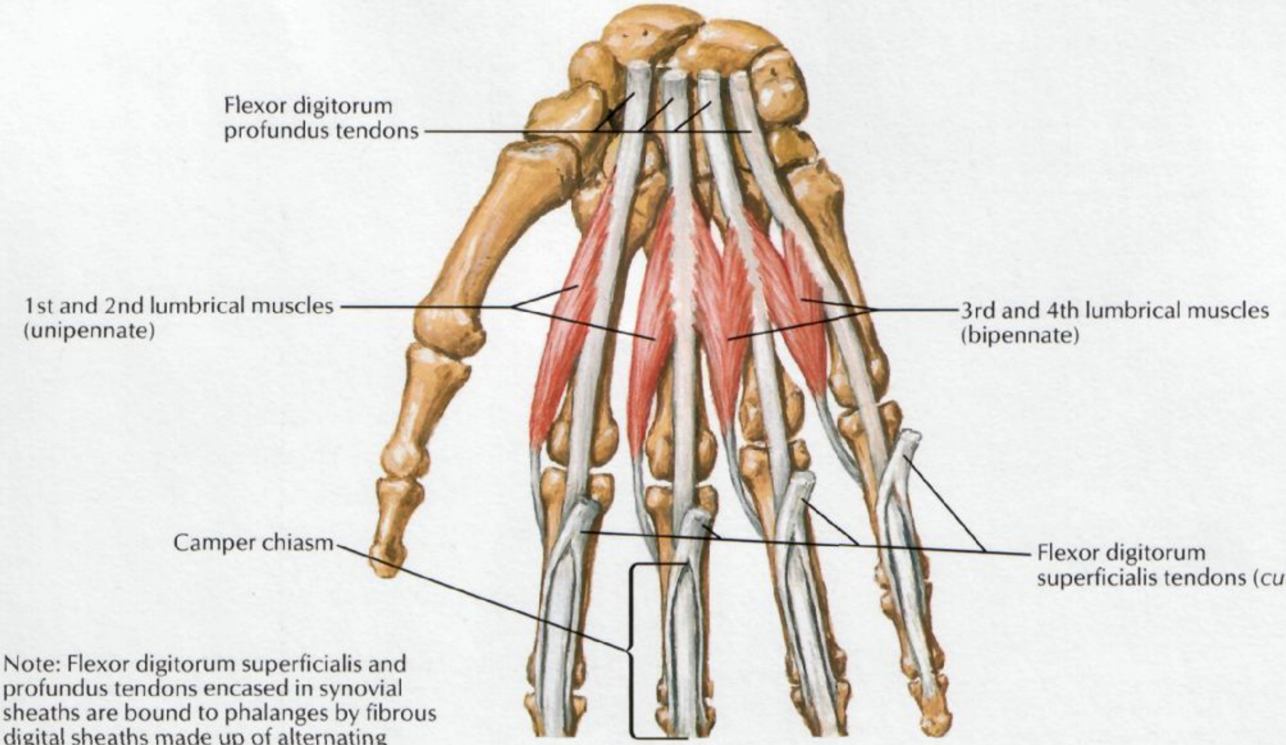
Usual arrangement


Tendinous sheath of flexor pollicis longus (radial bursa)
Common flexor sheath (ulnar bursa)
Thenar space
Midpalmar space
Lumbrical muscles (in fascial sheaths)
(Synovial) tendon sheaths of fingers

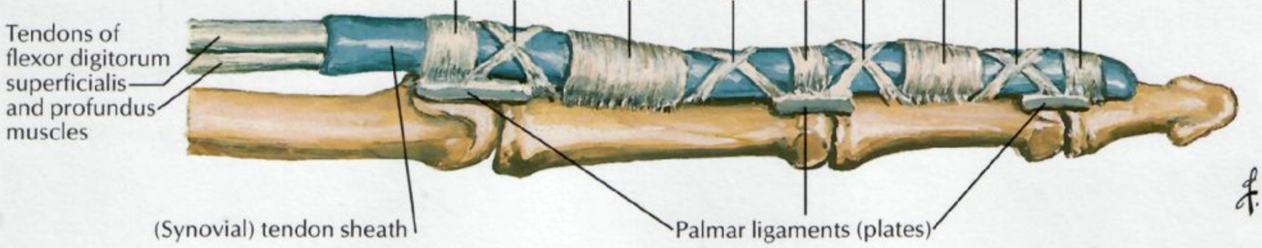
Common variation


Intermediate bursa (communication between common flexor sheath [ulnar bursa] and tendinous sheath of flexor pollicis longus [radial bursa])

Lumbrical muscles: schema


Flexor digitorum profundus tendons
1st and 2nd lumbrical muscles (unipennate)
3rd and 4th lumbrical muscles (bipennate)
Camper chiasm
Flexor digitorum superficialis tendons (*cut*)

Note: Flexor digitorum superficialis and profundus tendons encased in synovial sheaths are bound to phalanges by fibrous digital sheaths made up of alternating strong anular (A) and weaker cruciform (C) parts (pulleys)


A1
C1
A2
C2
A3
C3
A4
C4
A5
Tendons of flexor digitorum superficialis and profundus muscles
(Synovial) tendon sheath
Palmar ligaments (plates)

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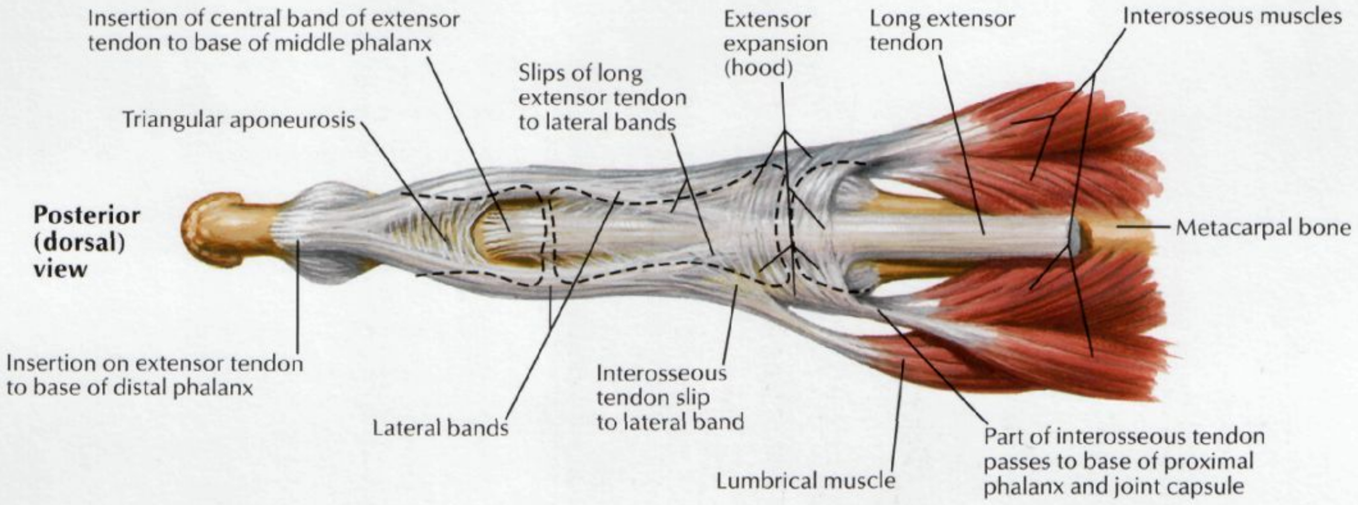
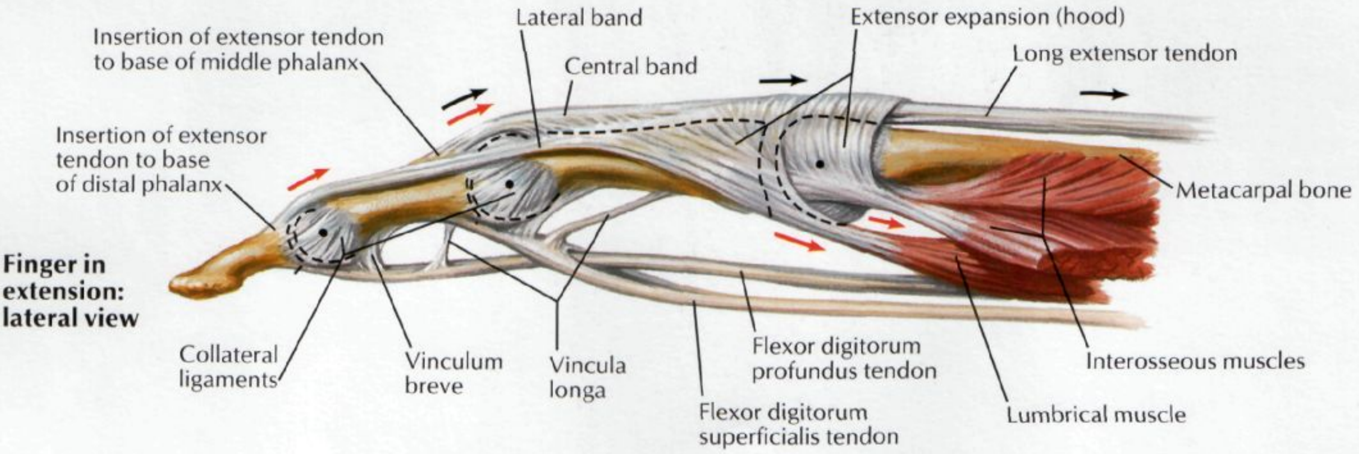
Flexor and Extensor Tendons in Fingers

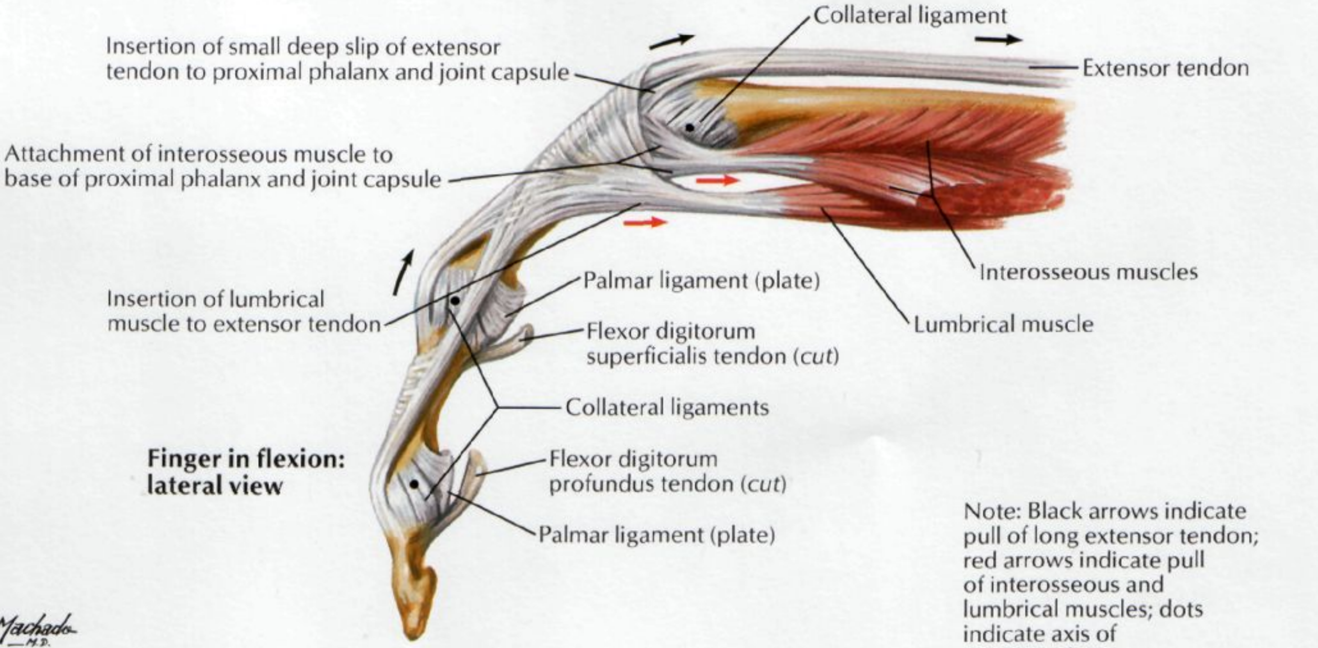
Posterior (dorsal) view


Insertion of central band of extensor tendon to base of middle phalanx
Triangular aponeurosis
Slips of long extensor tendon to lateral bands
Extensor expansion (hood)
Long extensor tendon
Interosseous muscles
Metacarpal bone
Insertion on extensor tendon to base of distal phalanx
Lateral bands
Interosseous tendon slip to lateral band
Lumbrical muscle
Part of interosseous tendon passes to base of proximal phalanx and joint capsule

Finger in extension: lateral view


Insertion of extensor tendon to base of middle phalanx
Lateral band
Central band
Extensor expansion (hood)
Long extensor tendon
Insertion of extensor tendon to base of distal phalanx
Metacarpal bone
Collateral ligaments
Vinculum breve
Vincula longa
Flexor digitorum profundus tendon
Flexor digitorum superficialis tendon
Interosseous muscles
Lumbrical muscle

Finger in flexion: lateral view


Collateral ligament
Insertion of small deep slip of extensor tendon to proximal phalanx and joint capsule
Extensor tendon
Attachment of interosseous muscle to base of proximal phalanx and joint capsule
Insertion of lumbrical muscle to extensor tendon
Palmar ligament (plate)
Flexor digitorum superficialis tendon (*cut*)
Interosseous muscles
Lumbrical muscle
Collateral ligaments
Flexor digitorum profundus tendon (*cut*)
Palmar ligament (plate)

Note: Black arrows indicate pull of long extensor tendon; red arrows indicate pull of interosseous and lumbrical muscles; dots indicate axis of rotation of joints

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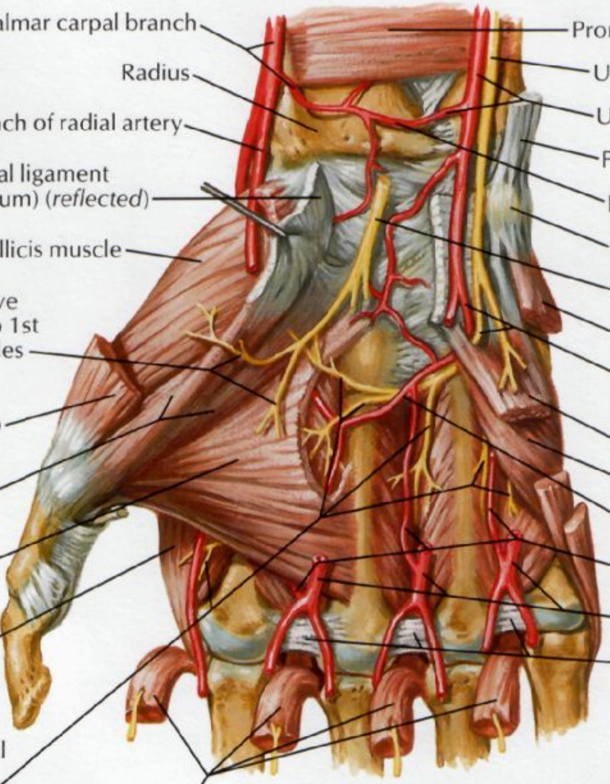
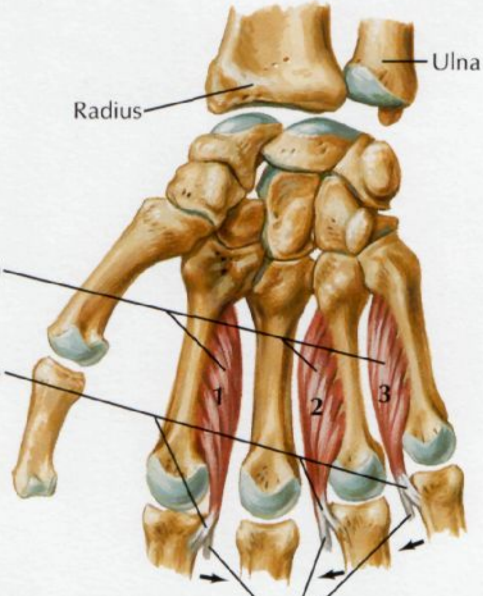
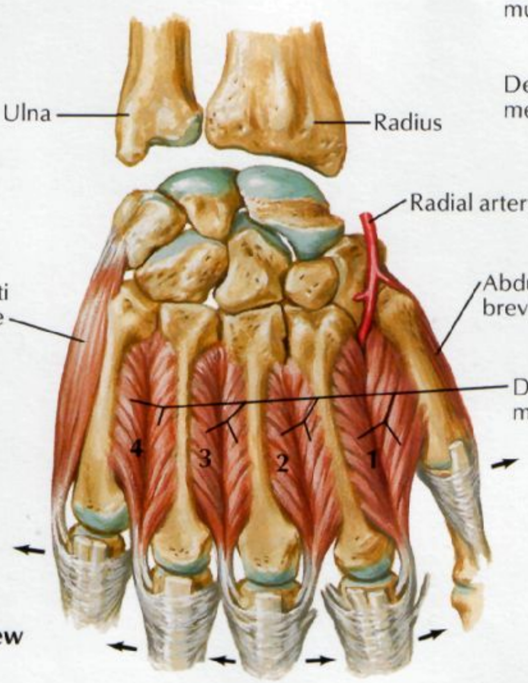
Intrinsic Muscles of Hand


Radial artery and palmar carpal branch
Radius
Superficial palmar branch of radial artery
Transverse carpal ligament (flexor retinaculum) (*reflected*)
Opponens pollicis muscle
Branches of median nerve to thenar muscles and to 1st and 2nd lumbrical muscles
Abductor pollicis brevis muscle (*cut*)
Flexor pollicis brevis muscle
Adductor pollicis muscle
1st dorsal interosseous muscle
Branches from deep branch of ulnar nerve to 3rd and 4th lumbrical muscles and to all interosseous muscles
Lumbrical muscles (*reflected*)
Pronator quadratus muscle
Ulnar nerve
Ulnar artery and palmar carpal branch
Flexor carpi ulnaris tendon
Palmar carpal arterial arch
Pisiform
Median nerve
Abductor digiti minimi muscle (*cut*)
Deep palmar branch of ulnar artery and deep branch of ulnar nerve
Flexor digiti minimi brevis muscle (*cut*)
Opponens digiti minimi muscle
Deep palmar (arterial) arch
Palmar metacarpal arteries
Common palmar digital arteries
Deep transverse metacarpal ligaments

Anterior (palmar) view


Ulna
Radius
Palmar interosseous muscles (unipennate)
1
2
3
Deep transverse metacarpal ligaments
Tendinous slips to extensor expansions (hoods)

Anterior (palmar) view


Ulna
Radius
Radial artery
Abductor digiti minimi muscle
Abductor pollicis brevis muscle
Dorsal interosseous muscles (bipennate)
4
3
2
1
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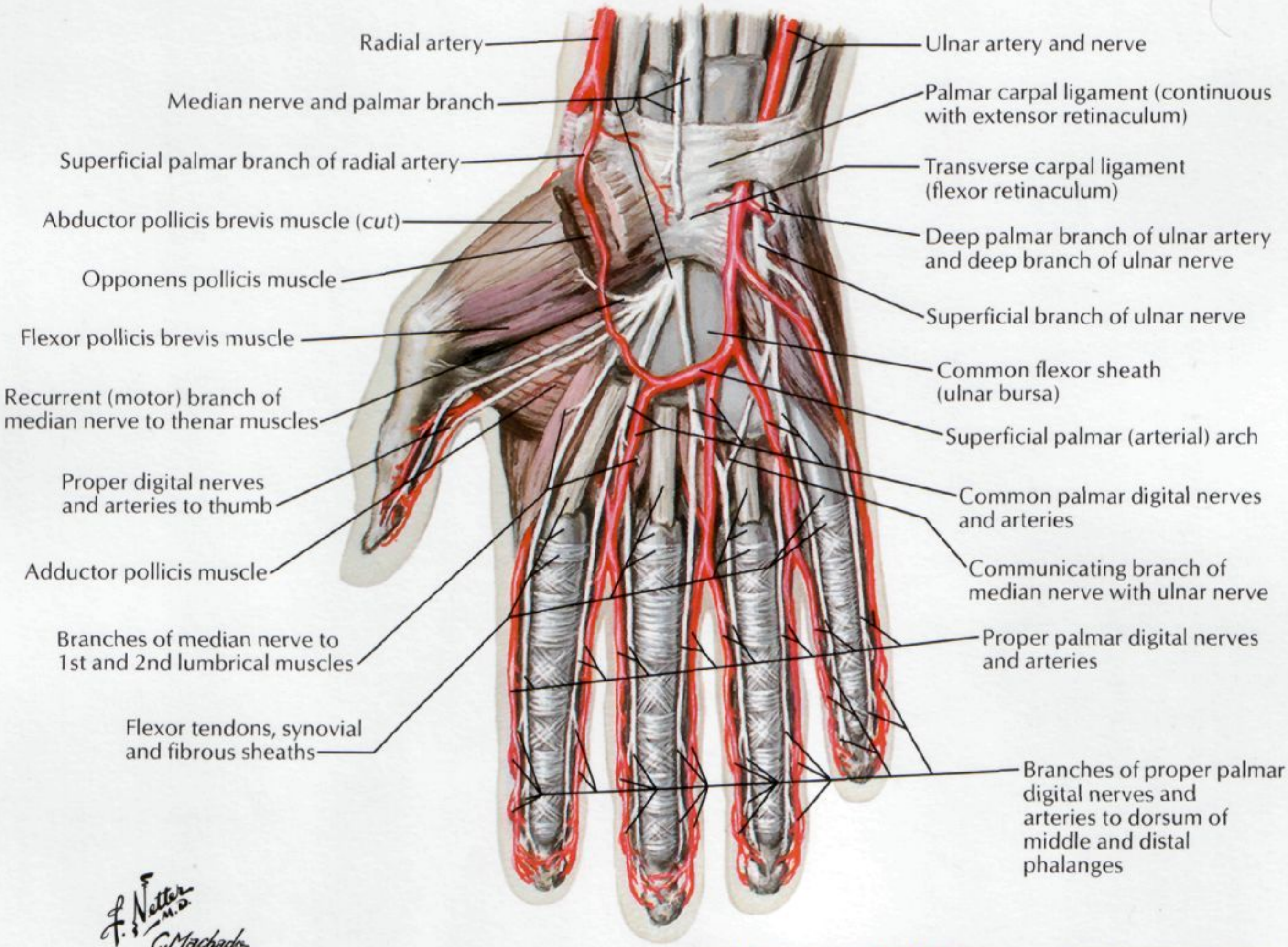
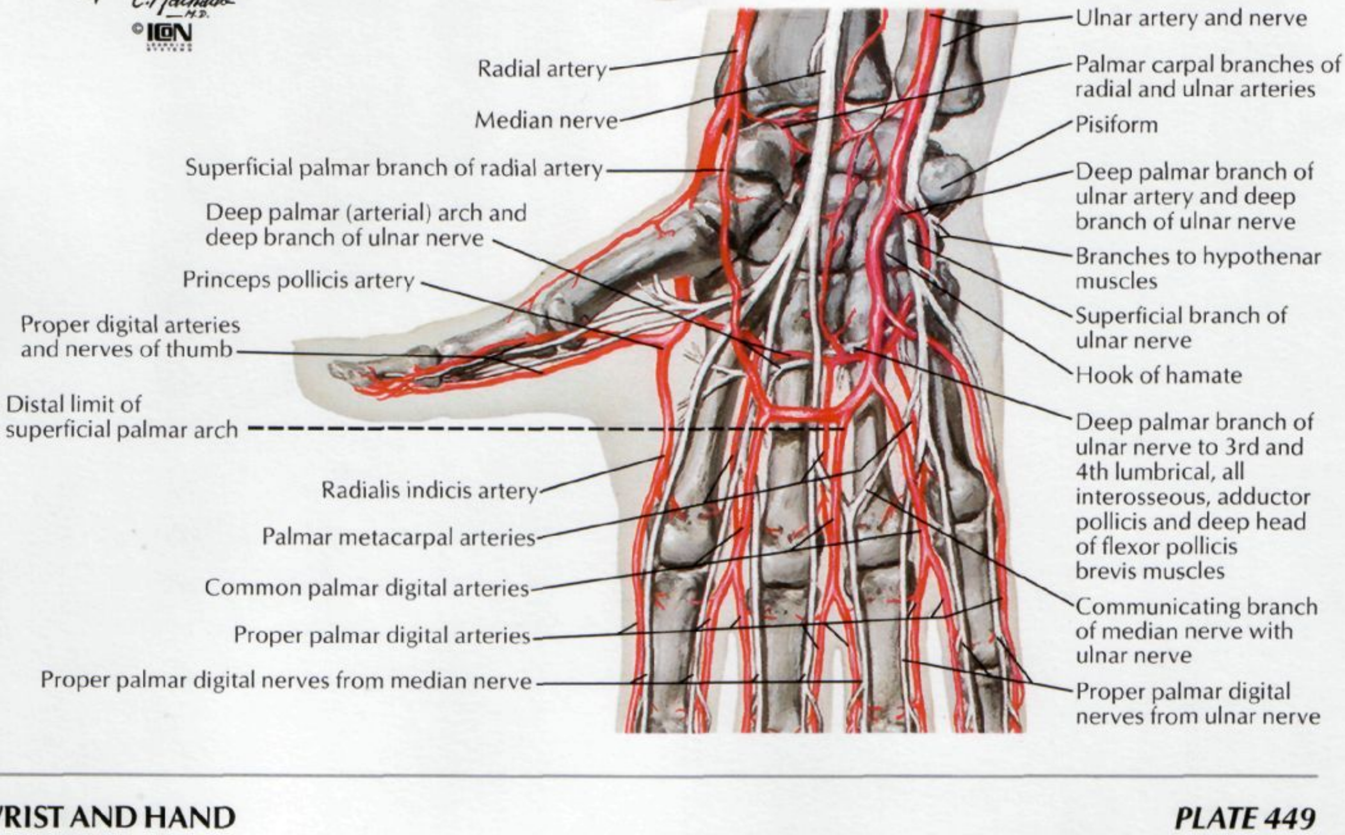
Posterior (dorsal) view

Note: Arrows indicate action of muscles

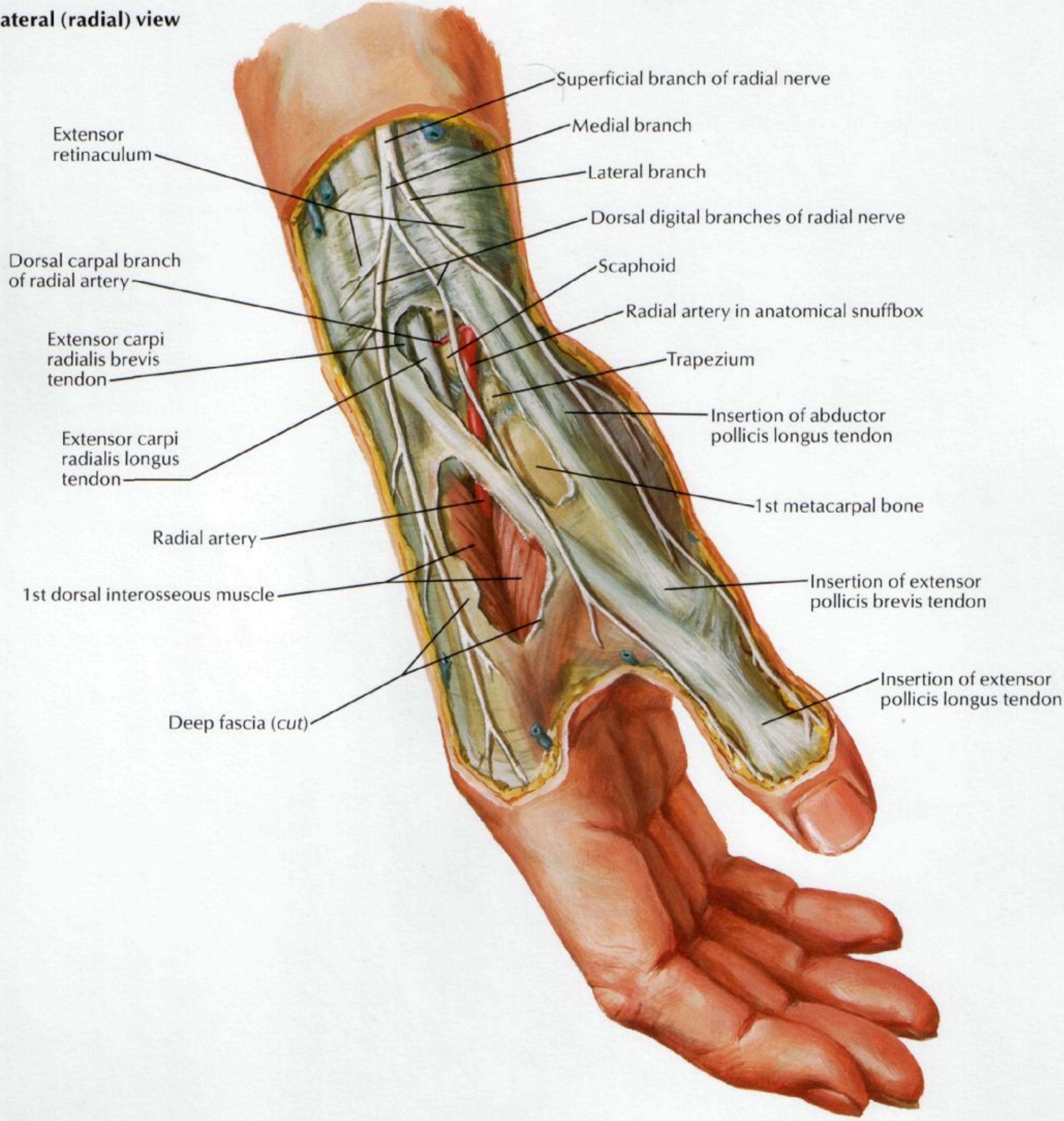
Arteries and Nerves of Hand: Palmar Views


Radial artery
Median nerve and palmar branch
Superficial palmar branch of radial artery
Abductor pollicis brevis muscle (*cut*)
Opponens pollicis muscle
Flexor pollicis brevis muscle
Recurrent (motor) branch of median nerve to thenar muscles
Proper digital nerves and arteries to thumb
Adductor pollicis muscle
Branches of median nerve to 1st and 2nd lumbrical muscles
Flexor tendons, synovial and fibrous sheaths
Ulnar artery and nerve
Palmar carpal ligament (continuous with extensor retinaculum)
Transverse carpal ligament (flexor retinaculum)
Deep palmar branch of ulnar artery and deep branch of ulnar nerve
Superficial branch of ulnar nerve
Common flexor sheath (ulnar bursa)
Superficial palmar (arterial) arch
Common palmar digital nerves and arteries
Communicating branch of median nerve with ulnar nerve
Proper palmar digital nerves and arteries
Branches of proper palmar digital nerves and arteries to dorsum of middle and distal phalanges


Radial artery
Median nerve
Superficial palmar branch of radial artery
Deep palmar (arterial) arch and deep branch of ulnar nerve
Princeps pollicis artery
Proper digital arteries and nerves of thumb
Distal limit of superficial palmar arch
Radialis indicis artery
Palmar metacarpal arteries
Common palmar digital arteries
Proper palmar digital arteries
Proper palmar digital nerves from median nerve
Ulnar artery and nerve
Palmar carpal branches of radial and ulnar arteries
Pisiform
Deep palmar branch of ulnar artery and deep branch of ulnar nerve
Branches to hypothenar muscles
Superficial branch of ulnar nerve
Hook of hamate
Deep palmar branch of ulnar nerve to 3rd and 4th lumbrical, all interosseous, adductor pollicis and deep head of flexor pollicis brevis muscles
Communicating branch of median nerve with ulnar nerve
Proper palmar digital nerves from ulnar nerve

Wrist and Hand: Superficial Radial Dissection

Lateral (radial) view


Superficial branch of radial nerve
Medial branch
Lateral branch
Dorsal digital branches of radial nerve
Scaphoid
Radial artery in anatomical snuffbox
Trapezium
Insertion of abductor pollicis longus tendon
1st metacarpal bone
Insertion of extensor pollicis brevis tendon
Insertion of extensor pollicis longus tendon
Extensor retinaculum
Dorsal carpal branch of radial artery
Extensor carpi radialis brevis tendon
Extensor carpi radialis longus tendon
Radial artery
1st dorsal interosseous muscle
Deep fascia (*cut*)

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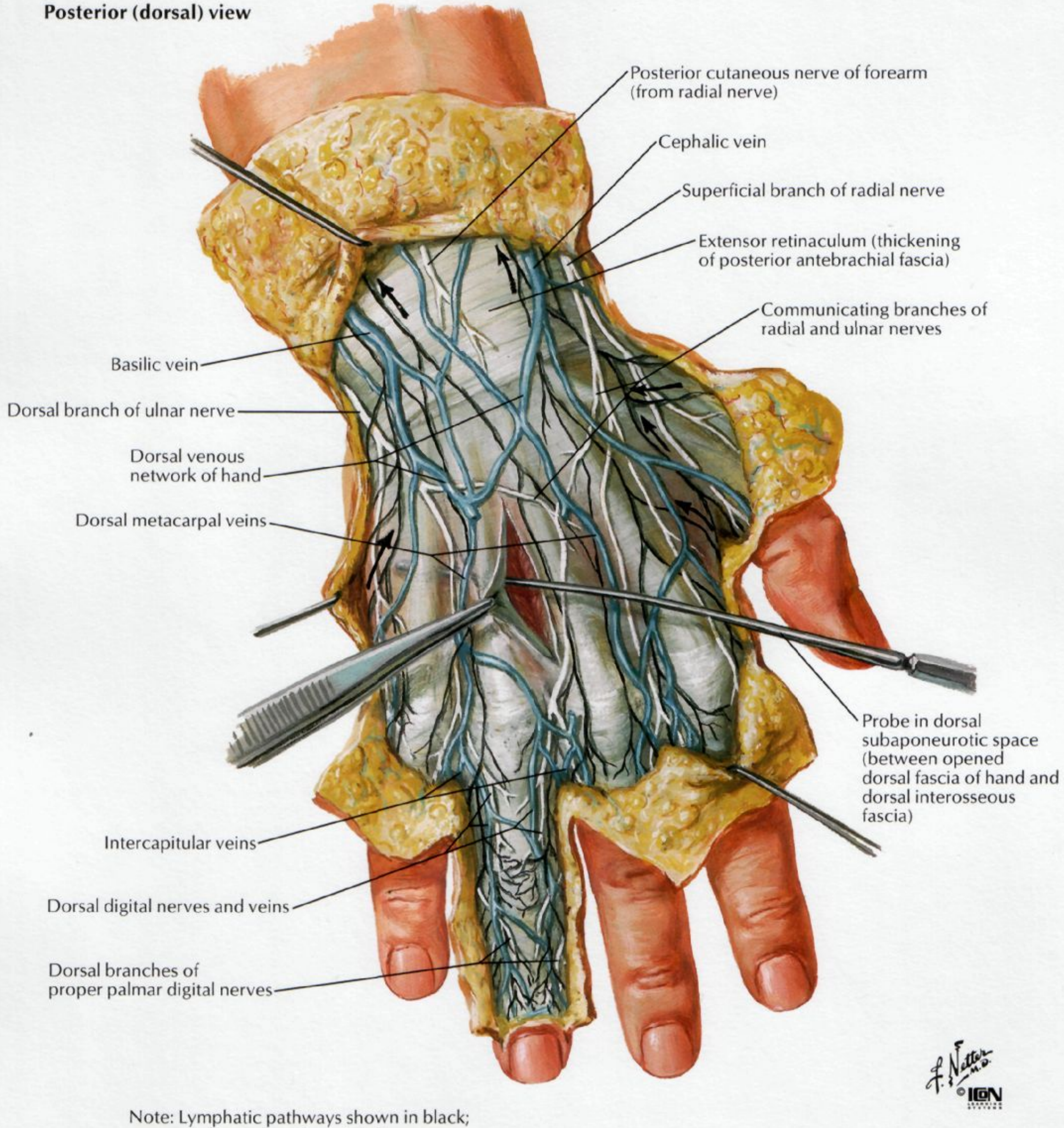
Wrist and Hand: Superficial Dorsal Dissection

Posterior (dorsal) view


Posterior cutaneous nerve of forearm (from radial nerve)
Cephalic vein
Superficial branch of radial nerve
Extensor retinaculum (thickening of posterior antebrachial fascia)
Communicating branches of radial and ulnar nerves
Basilic vein
Dorsal branch of ulnar nerve
Dorsal venous network of hand
Dorsal metacarpal veins
Probe in dorsal subaponeurotic space (between opened dorsal fascia of hand and dorsal interosseous fascia)
Intercapitular veins
Dorsal digital nerves and veins
Dorsal branches of proper palmar digital nerves
F. Netter M.D.
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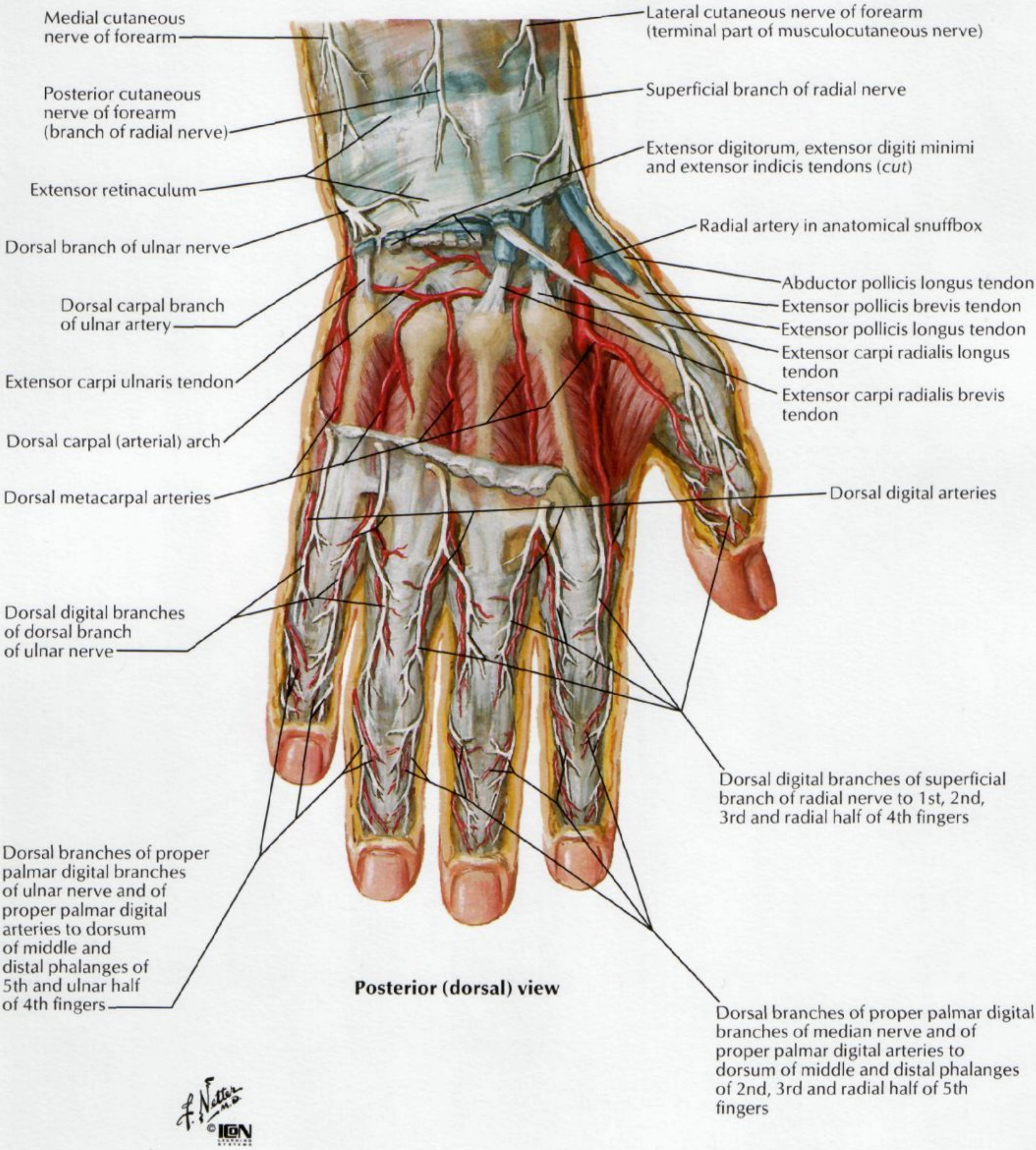
Note: Lymphatic pathways shown in black; arrows indicate direction of drainage

Wrist and Hand: Deep Dorsal Dissection


Medial cutaneous nerve of forearm
Posterior cutaneous nerve of forearm (branch of radial nerve)
Extensor retinaculum
Dorsal branch of ulnar nerve
Dorsal carpal branch of ulnar artery
Extensor carpi ulnaris tendon
Dorsal carpal (arterial) arch
Dorsal metacarpal arteries
Dorsal digital branches of dorsal branch of ulnar nerve
Dorsal branches of proper palmar digital branches of ulnar nerve and of proper palmar digital arteries to dorsum of middle and distal phalanges of 5th and ulnar half of 4th fingers
Lateral cutaneous nerve of forearm (terminal part of musculocutaneous nerve)
Superficial branch of radial nerve
Extensor digitorum, extensor digiti minimi and extensor indicis tendons (cut)
Radial artery in anatomical snuffbox
Abductor pollicis longus tendon
Extensor pollicis brevis tendon
Extensor pollicis longus tendon
Extensor carpi radialis longus tendon
Extensor carpi radialis brevis tendon
Dorsal digital arteries
Dorsal digital branches of superficial branch of radial nerve to 1st, 2nd, 3rd and radial half of 4th fingers
Dorsal branches of proper palmar digital branches of median nerve and of proper palmar digital arteries to dorsum of middle and distal phalanges of 2nd, 3rd and radial half of 5th fingers
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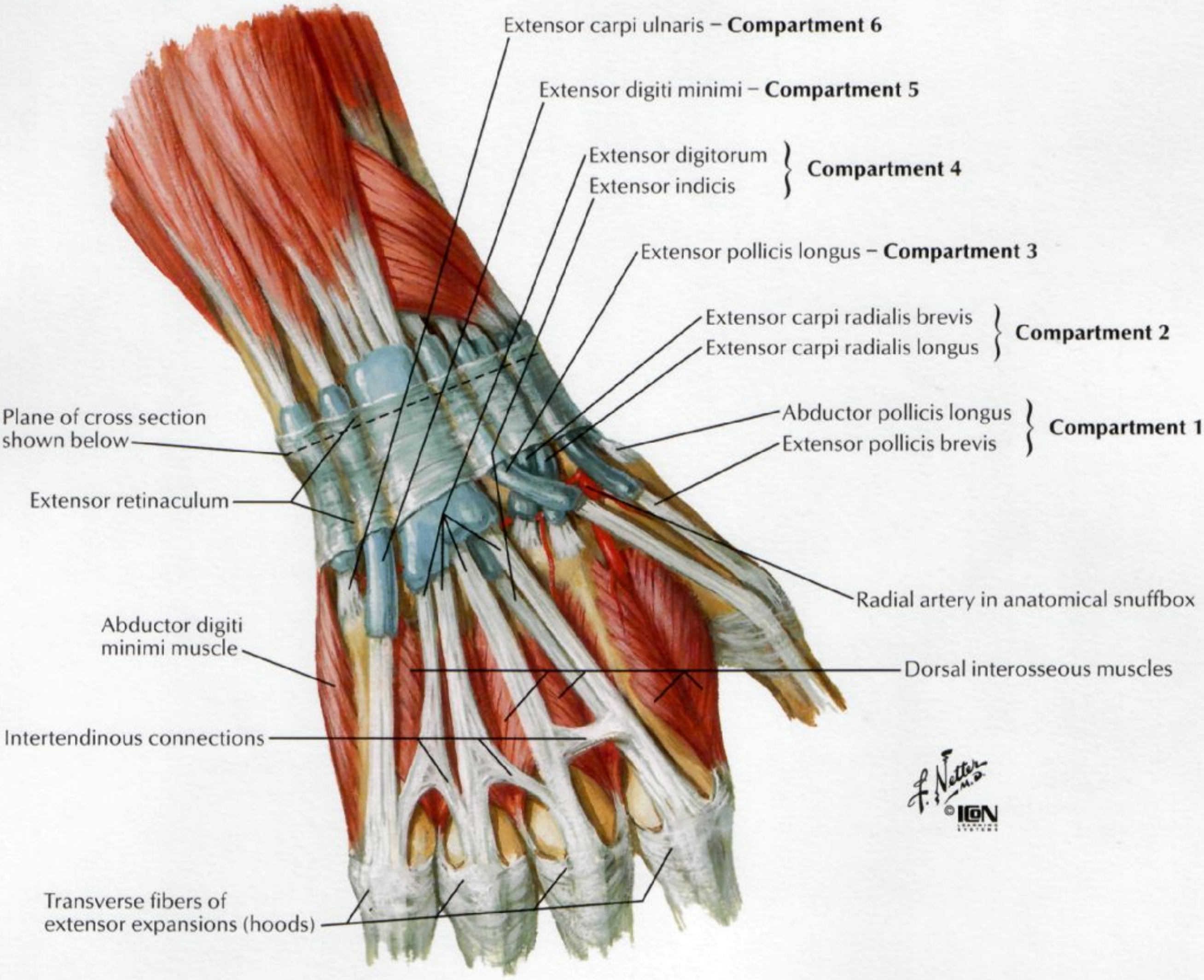
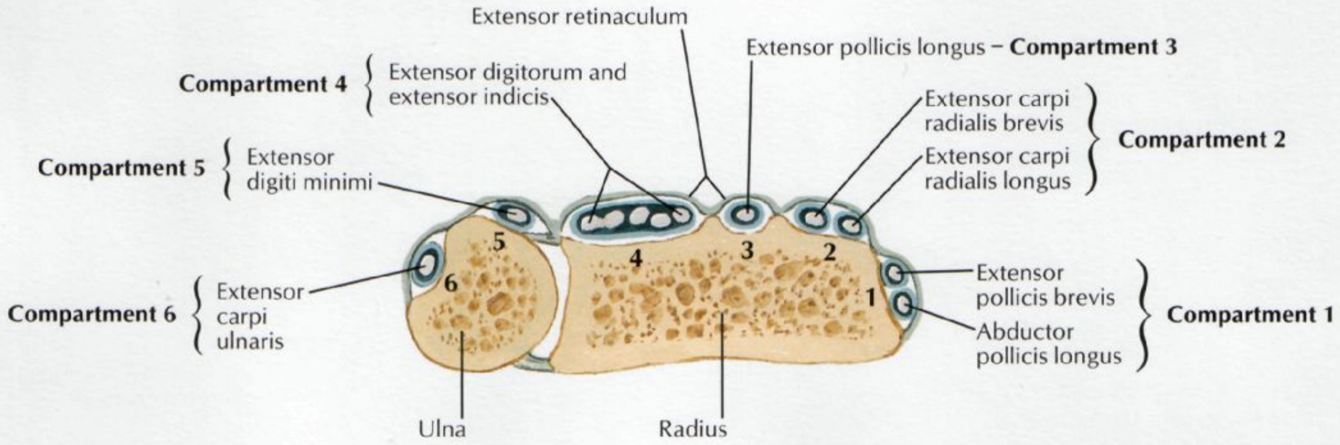
Posterior (dorsal) view

Extensor Tendons at Wrist

Posterior (dorsal) view

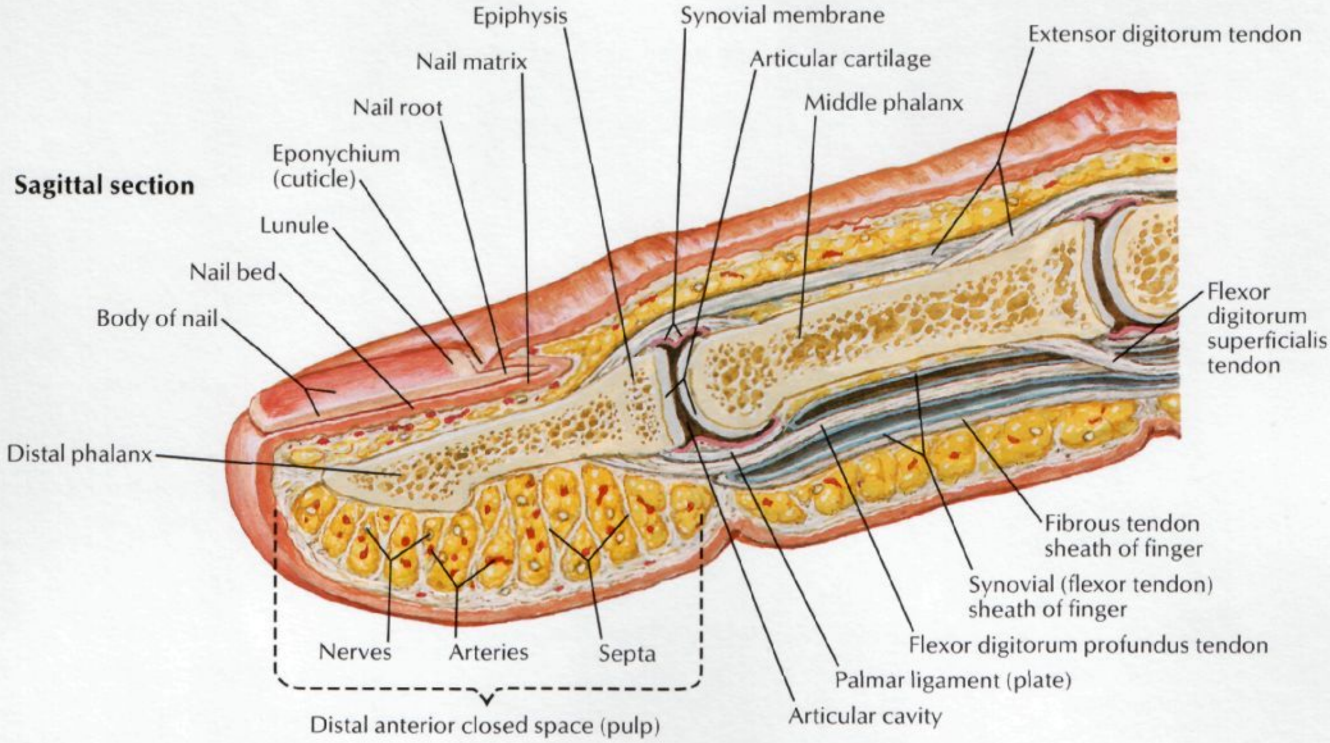

Extensor carpi ulnaris – **Compartment 6**
Extensor digiti minimi – **Compartment 5**
Extensor digitorum
Extensor indicis
Compartment 4
Extensor pollicis longus – **Compartment 3**
Extensor carpi radialis brevis
Extensor carpi radialis longus
Compartment 2
Abductor pollicis longus
Extensor pollicis brevis
Compartment 1
Plane of cross section shown below
Extensor retinaculum
Radial artery in anatomical snuffbox
Abductor digiti minimi muscle
Dorsal interosseous muscles
Intertendinous connections
Transverse fibers of extensor expansions (hoods)

Cross section of most distal portion of forearm

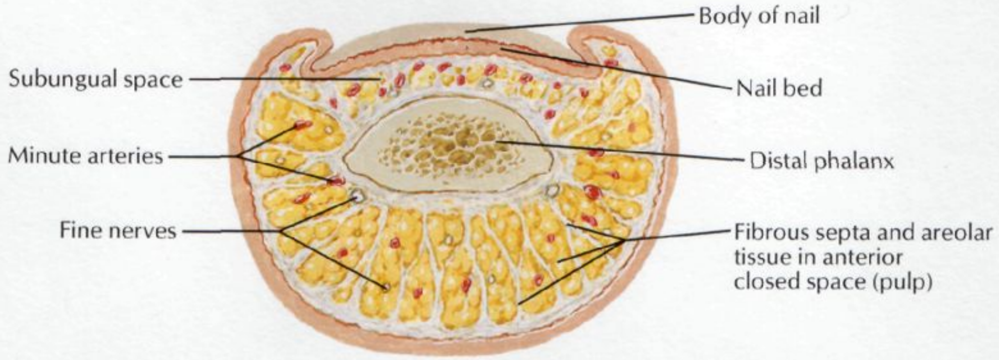


Fingers

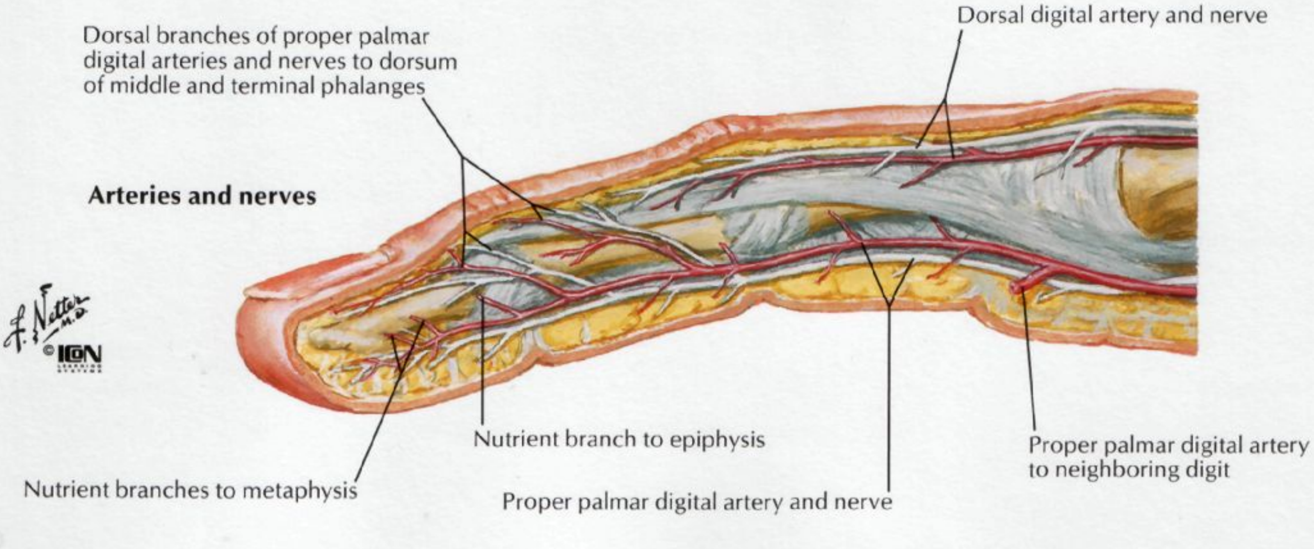
Sagittal section


Epiphysis
Synovial membrane
Extensor digitorum tendon
Nail matrix
Articular cartilage
Middle phalanx
Nail root
Eponychium (cuticle)
Lunule
Nail bed
Body of nail
Flexor digitorum superficialis tendon
Distal phalanx
Fibrous tendon sheath of finger
Synovial (flexor tendon) sheath of finger
Nerves
Arteries
Septa
Flexor digitorum profundus tendon
Palmar ligament (plate)
Articular cavity
Distal anterior closed space (pulp)

Cross section through distal phalanx



Arteries and nerves


Dorsal branches of proper palmar digital arteries and nerves to dorsum of middle and terminal phalanges
Dorsal digital artery and nerve
F. Netter M.D.
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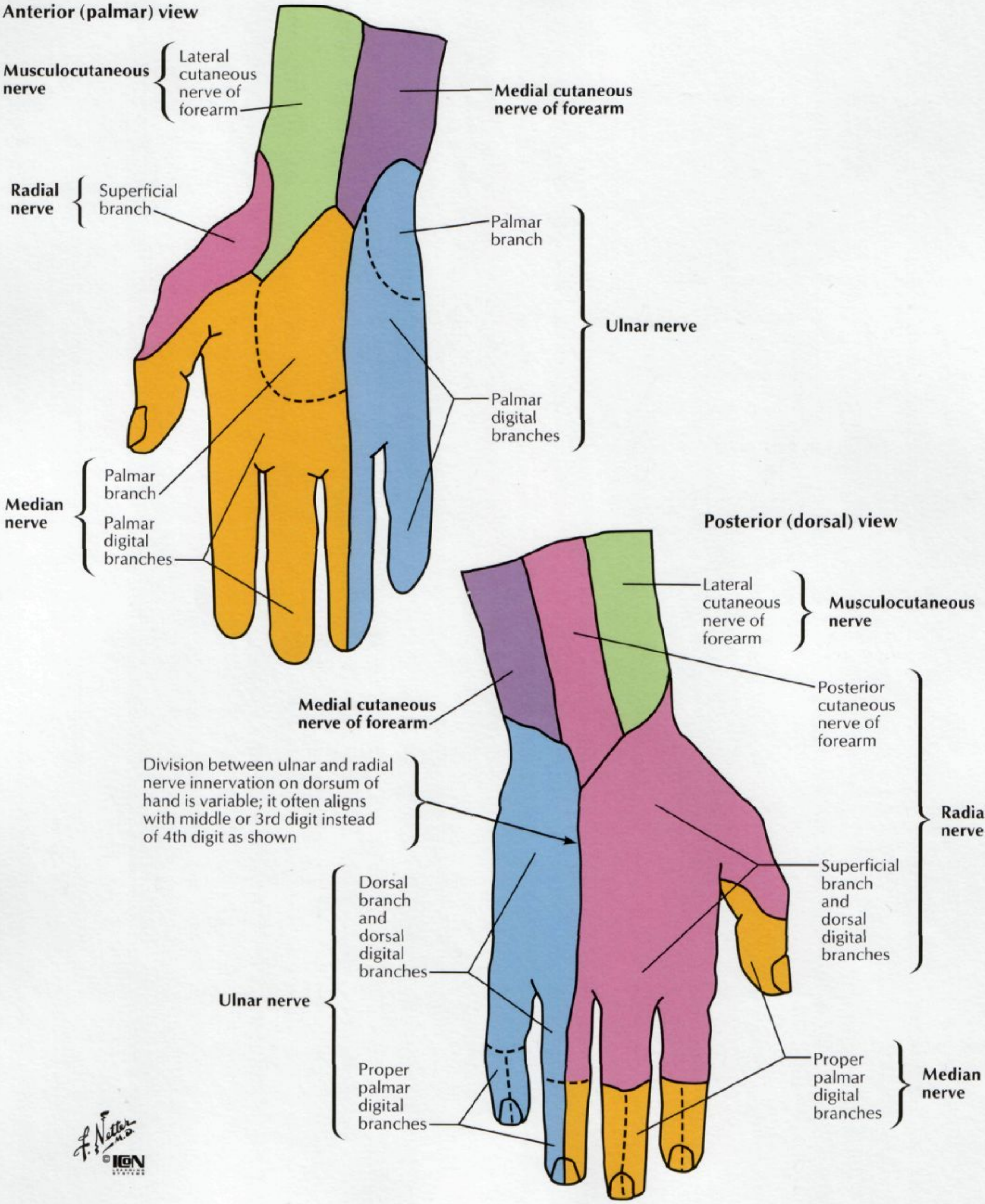
Nutrient branch to epiphysis
Proper palmar digital artery to neighboring digit
Nutrient branches to metaphysis
Proper palmar digital artery and nerve

Cutaneous Innervation of Wrist and Hand


Anterior (palmar) view
Musculocutaneous nerve
Lateral cutaneous nerve of forearm
Medial cutaneous nerve of forearm
Radial nerve
Superficial branch
Palmar branch
Ulnar nerve
Palmar digital branches
Median nerve
Palmar branch
Palmar digital branches
Posterior (dorsal) view
Lateral cutaneous nerve of forearm
Musculocutaneous nerve
Medial cutaneous nerve of forearm
Posterior cutaneous nerve of forearm
Division between ulnar and radial nerve innervation on dorsum of hand is variable; it often aligns with middle or 3rd digit instead of 4th digit as shown
Radial nerve
Superficial branch and dorsal digital branches
Ulnar nerve
Dorsal branch and dorsal digital branches
Proper palmar digital branches
Proper palmar digital branches
Median nerve
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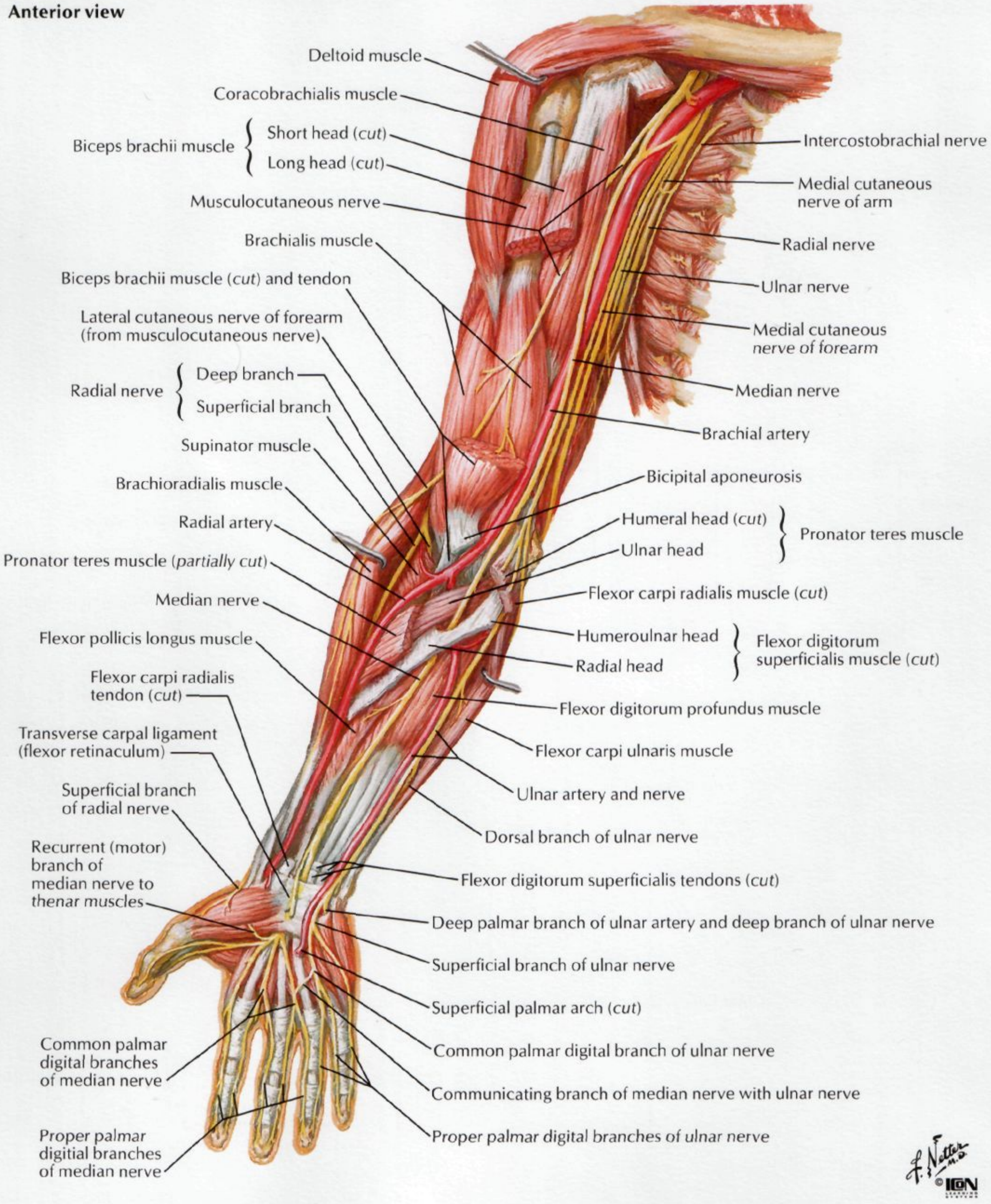
Arteries and Nerves of Upper Limb

Anterior view


Deltoid muscle
Coracobrachialis muscle
Biceps brachii muscle
Short head (*cut*)
Long head (*cut*)
Musculocutaneous nerve
Brachialis muscle
Biceps brachii muscle (*cut*) and tendon
Lateral cutaneous nerve of forearm (from musculocutaneous nerve)
Radial nerve
Deep branch
Superficial branch
Supinator muscle
Brachioradialis muscle
Radial artery
Pronator teres muscle (*partially cut*)
Median nerve
Flexor pollicis longus muscle
Flexor carpi radialis tendon (*cut*)
Transverse carpal ligament (flexor retinaculum)
Superficial branch of radial nerve
Recurrent (motor) branch of median nerve to *thenar muscles*
Common palmar digital branches of median nerve
Proper palmar digitial branches of median nerve
Intercostobrachial nerve
Medial cutaneous nerve of arm
Radial nerve
Ulnar nerve
Medial cutaneous *nerve of forearm*
Median nerve
Brachial artery
Bicipital aponeurosis
Humeral head (*cut*)
Ulnar head
Pronator teres muscle
Flexor carpi radialis muscle (*cut*)
Humeroulnar head
Radial head
Flexor digitorum superficialis muscle (*cut*)
Flexor digitorum profundus muscle
Flexor carpi ulnaris muscle
Ulnar artery and nerve
Dorsal branch of ulnar nerve
Flexor digitorum superficialis tendons (*cut*)
Deep palmar branch of ulnar artery and deep branch of ulnar nerve
Superficial branch of ulnar nerve
Superficial palmar arch (*cut*)
Common palmar digital branch of ulnar nerve
Communicating branch of median nerve with ulnar nerve
Proper palmar digital branches of ulnar nerve
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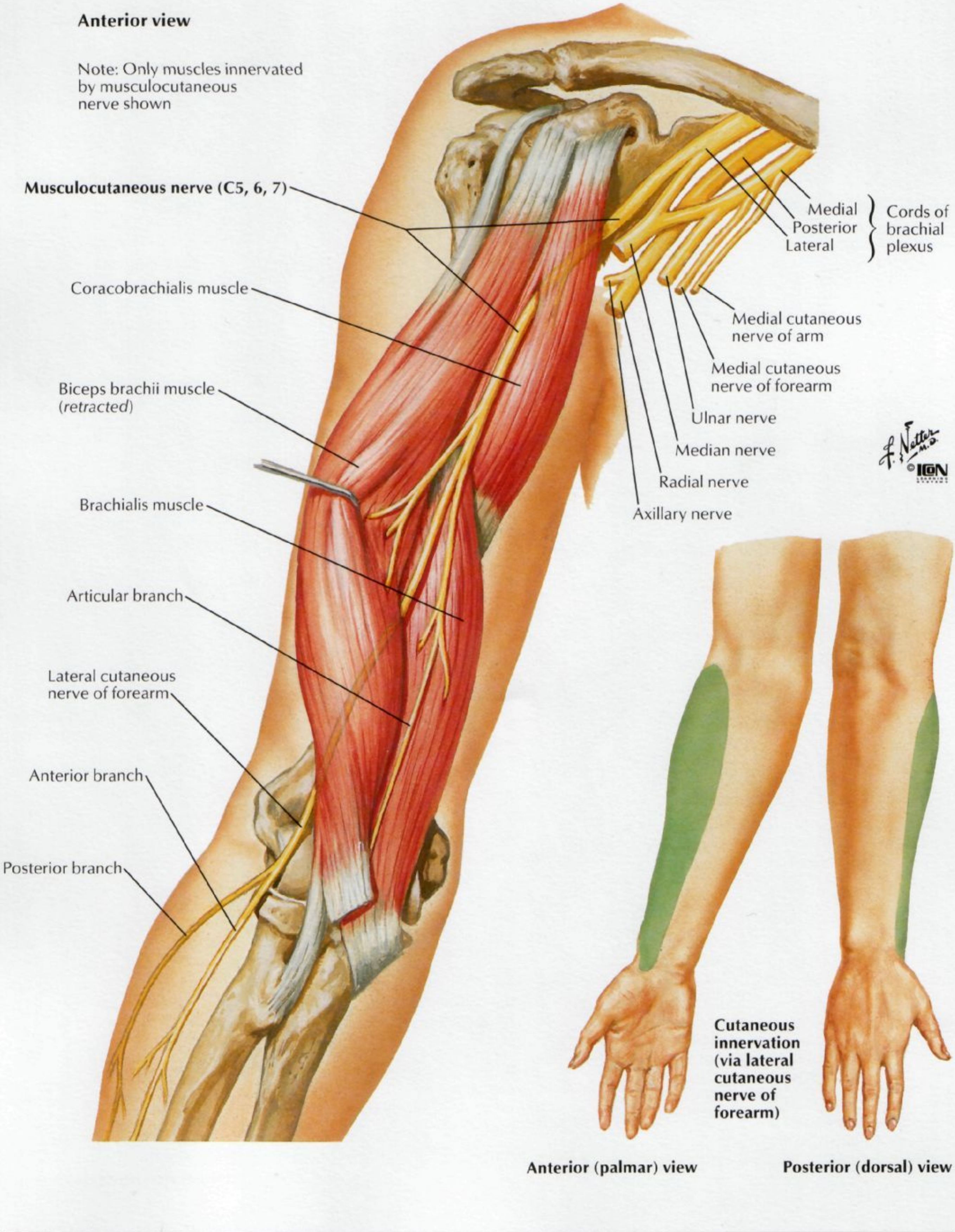
Musculocutaneous Nerve


Anterior view
Note: Only muscles innervated by musculocutaneous nerve shown
Musculocutaneous nerve (C5, 6, 7)
Coracobrachialis muscle
Biceps brachii muscle (retracted)
Brachialis muscle
Articular branch
Lateral cutaneous nerve of forearm
Anterior branch
Posterior branch
Medial
Posterior
Lateral
Cords of brachial plexus
Medial cutaneous nerve of arm
Medial cutaneous nerve of forearm
Ulnar nerve
Median nerve
Radial nerve
Axillary nerve
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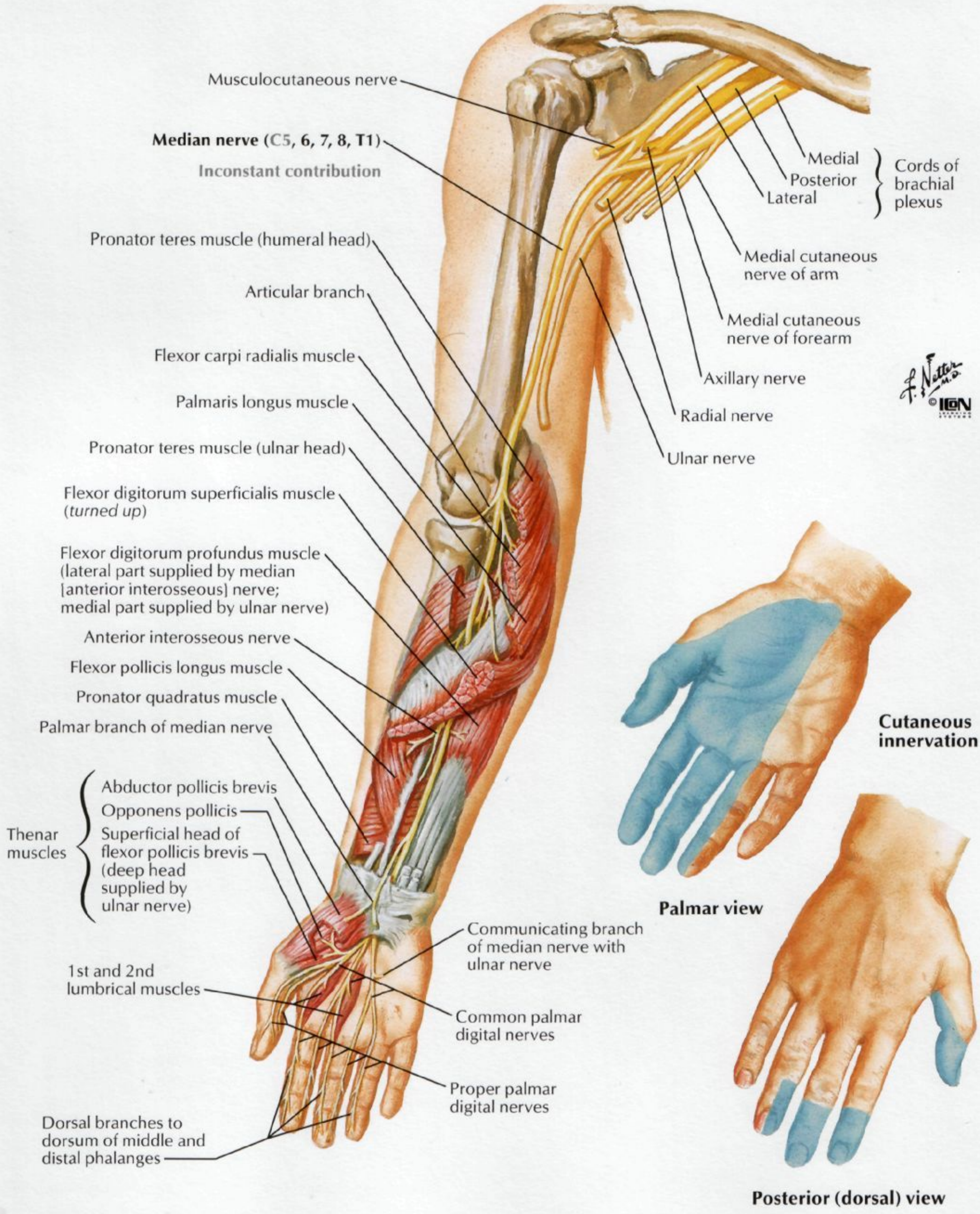
Cutaneous innervation (via lateral cutaneous nerve of forearm)
Anterior (palmar) view
Posterior (dorsal) view

Median Nerve

Anterior view

Note: Only muscles innervated by median nerve shown


Musculocutaneous nerve
Median nerve (C5, 6, 7, 8, T1)
Inconstant contribution
Pronator teres muscle (humeral head)
Articular branch
Flexor carpi radialis muscle
Palmaris longus muscle
Pronator teres muscle (ulnar head)
Flexor digitorum superficialis muscle (*turned up*)
Flexor digitorum profundus muscle (lateral part supplied by median [anterior interosseous] nerve; medial part supplied by ulnar nerve)
Anterior interosseous nerve
Flexor pollicis longus muscle
Pronator quadratus muscle
Palmar branch of median nerve
Thenar muscles
Abductor pollicis brevis
Opponens pollicis
Superficial head of flexor pollicis brevis (deep head supplied by ulnar nerve)
1st and 2nd lumbrical muscles
Dorsal branches to dorsum of middle and distal phalanges
Communicating branch of median nerve with ulnar nerve
Common palmar digital nerves
Proper palmar digital nerves
Medial
Posterior
Lateral
Cords of brachial plexus
Medial cutaneous nerve of arm
Medial cutaneous nerve of forearm
Axillary nerve
Radial nerve
Ulnar nerve
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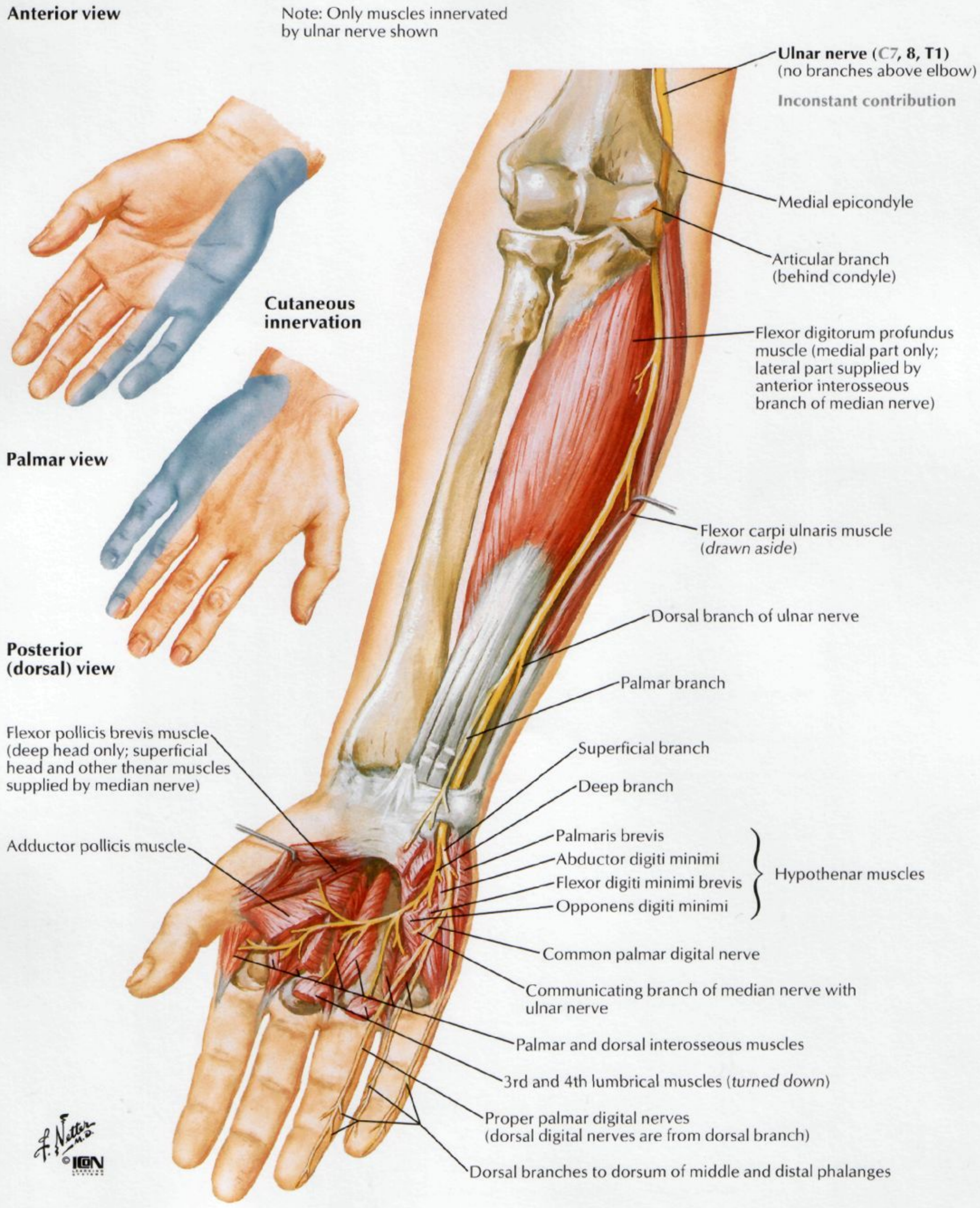
Cutaneous innervation
Palmar view
Posterior (dorsal) view

Ulnar Nerve


Anterior view
Note: Only muscles innervated by ulnar nerve shown
Ulnar nerve (C7, 8, T1)
(no branches above elbow)
Inconstant contribution
Medial epicondyle
Articular branch (behind condyle)
Flexor digitorum profundus muscle (medial part only; lateral part supplied by anterior interosseous branch of median nerve)
Flexor carpi ulnaris muscle (*drawn aside*)
Dorsal branch of ulnar nerve
Palmar branch
Superficial branch
Deep branch
Palmaris brevis
Abductor digiti minimi
Flexor digiti minimi brevis
Opponens digiti minimi
Hypothenar muscles
Common palmar digital nerve
Communicating branch of median nerve with ulnar nerve
Palmar and dorsal interosseous muscles
3rd and 4th lumbrical muscles (*turned down*)
Proper palmar digital nerves
(dorsal digital nerves are from dorsal branch)
Dorsal branches to dorsum of middle and distal phalanges
Cutaneous innervation
Palmar view
Posterior (dorsal) view
Flexor pollicis brevis muscle (deep head only; superficial head and other thenar muscles supplied by median nerve)
Adductor pollicis muscle
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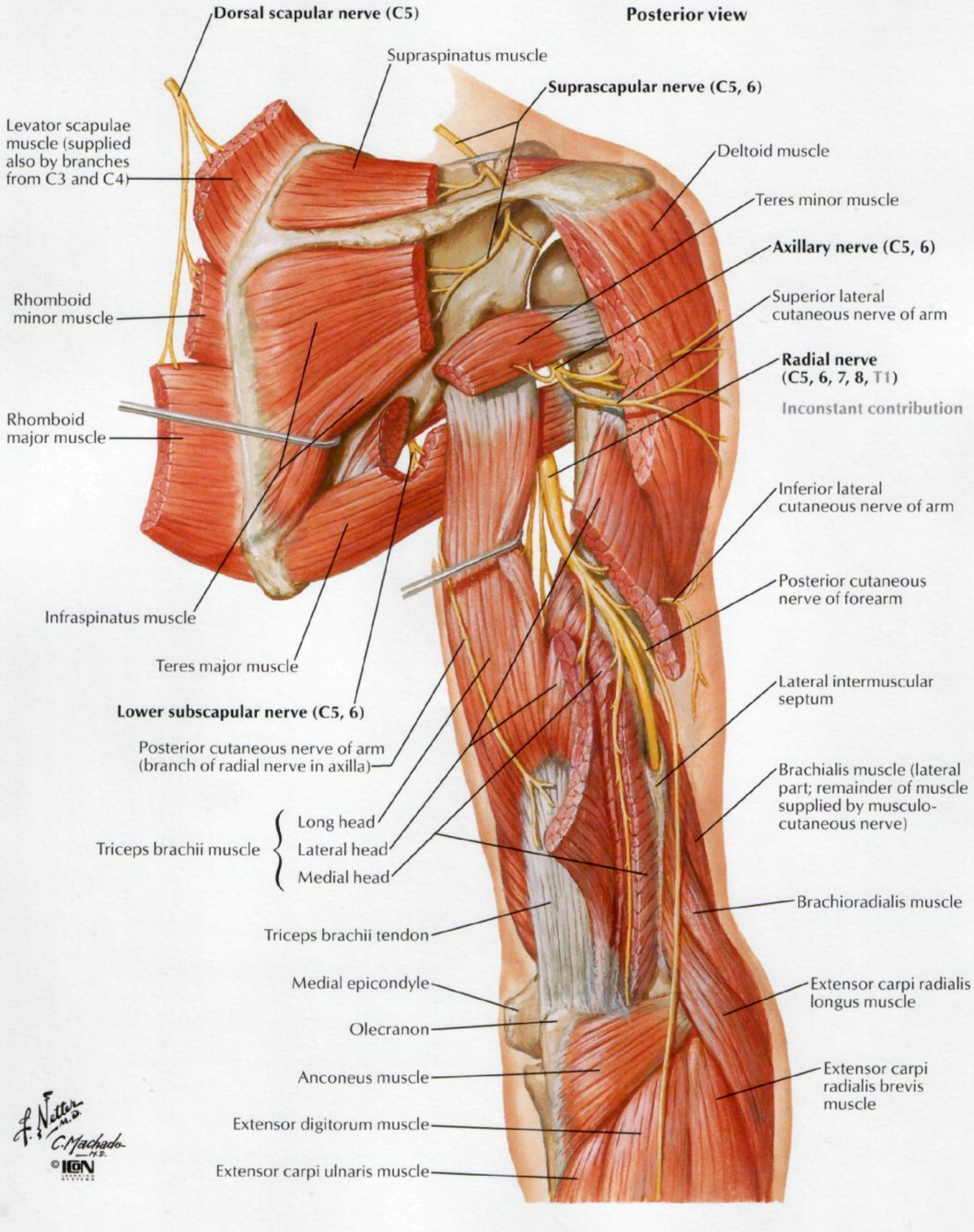
Radial Nerve in Arm and Nerves of Posterior Shoulder


Posterior view
Dorsal scapular nerve (C5)
Supraspinatus muscle
Suprascapular nerve (C5, 6)
Levator scapulae muscle (supplied also by branches from C3 and C4)
Deltoid muscle
Teres minor muscle
Axillary nerve (C5, 6)
Rhomboid minor muscle
Superior lateral cutaneous nerve of arm
Radial nerve (C5, 6, 7, 8, T1)
Inconstant contribution
Rhomboid major muscle
Inferior lateral cutaneous nerve of arm
Posterior cutaneous nerve of forearm
Infraspinatus muscle
Teres major muscle
Lateral intermuscular septum
Lower subscapular nerve (C5, 6)
Posterior cutaneous nerve of arm (branch of radial nerve in axilla)
Brachialis muscle (lateral part; remainder of muscle supplied by musculocutaneous nerve)
Triceps brachii muscle
Long head
Lateral head
Medial head
Brachioradialis muscle
Triceps brachii tendon
Medial epicondyle
Extensor carpi radialis longus muscle
Olecranon
Anconeus muscle
Extensor carpi radialis brevis muscle
Extensor digitorum muscle
Extensor carpi ulnaris muscle
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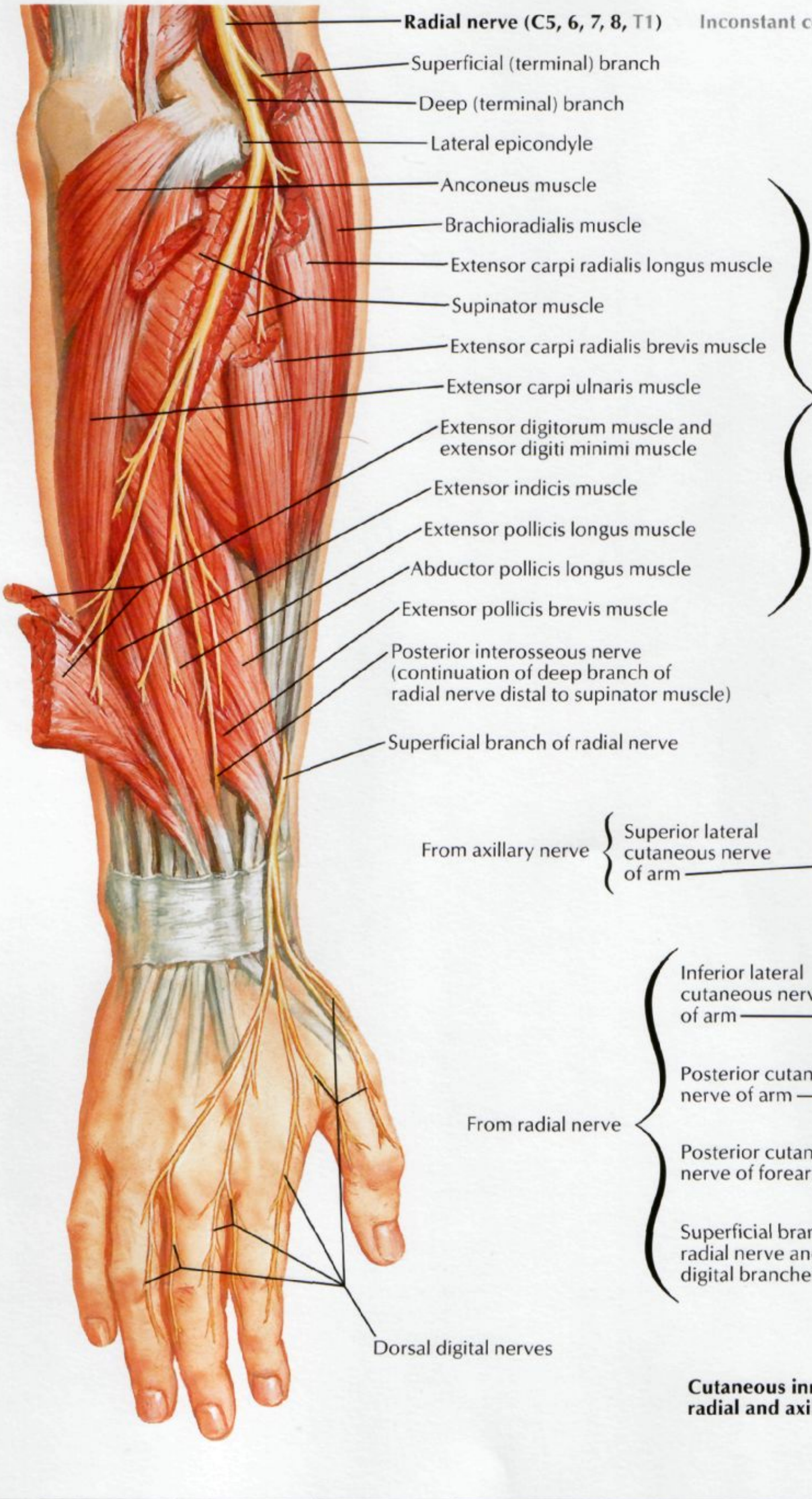
Radial Nerve in Forearm

SEE ALSO PLATE 450


Radial nerve (C5, 6, 7, 8, T1)
Inconstant contribution
Superficial (terminal) branch
Deep (terminal) branch
Lateral epicondyle
Anconeus muscle
Brachioradialis muscle
Extensor carpi radialis longus muscle
Supinator muscle
Extensor carpi radialis brevis muscle
Extensor carpi ulnaris muscle
Extensor digitorum muscle and extensor digiti minimi muscle
Extensor indicis muscle
Extensor pollicis longus muscle
Abductor pollicis longus muscle
Extensor pollicis brevis muscle
Extensor-supinator group of muscles
Posterior interosseous nerve (continuation of deep branch of radial nerve distal to supinator muscle)
Superficial branch of radial nerve
Dorsal digital nerves
Posterior view
F. Netter M.D.
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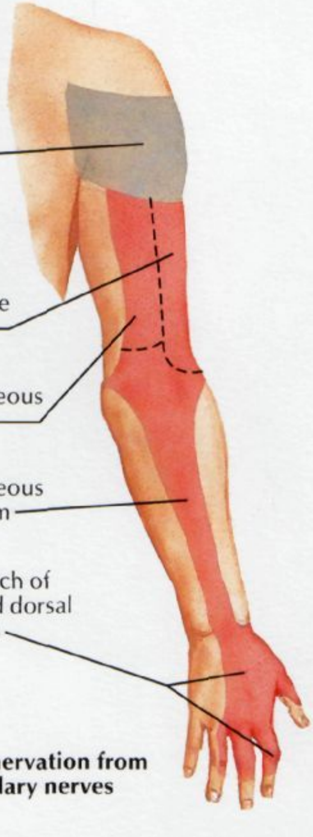
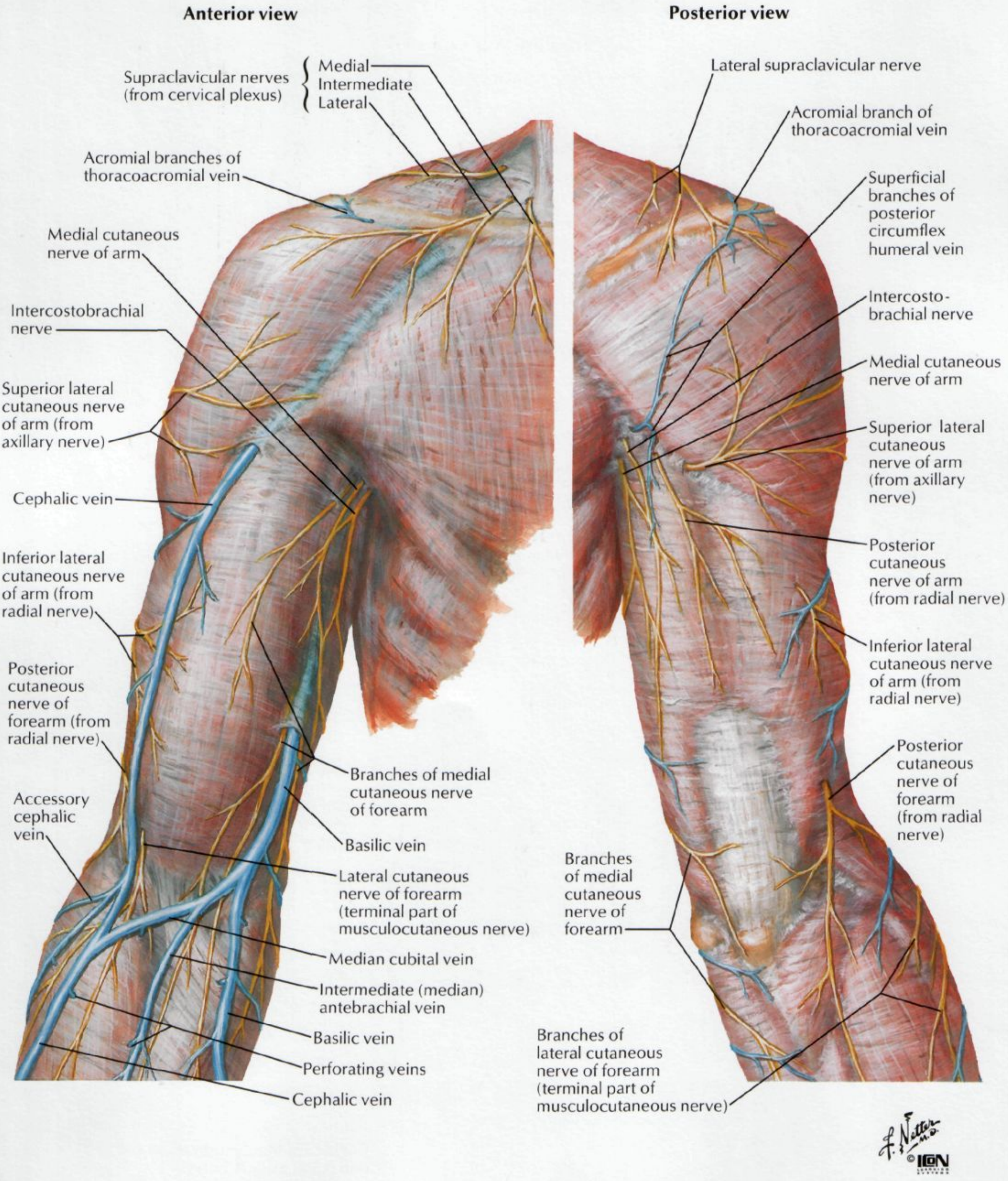

From axillary nerve
Superior lateral cutaneous nerve of arm
From radial nerve
Inferior lateral cutaneous nerve of arm
Posterior cutaneous nerve of arm
Posterior cutaneous nerve of forearm
Superficial branch of radial nerve and dorsal digital branches

Cutaneous innervation from radial and axillary nerves

Cutaneous Nerves and Superficial Veins of Shoulder and Arm


Anterior view
Posterior view
Supraclavicular nerves (from cervical plexus)
Medial
Intermediate
Lateral
Acromial branches of thoracoacromial vein
Medial cutaneous nerve of arm
Intercostobrachial nerve
Superior lateral cutaneous nerve of arm (from axillary nerve)
Cephalic vein
Inferior lateral cutaneous nerve of arm (from radial nerve)
Posterior cutaneous nerve of forearm (from radial nerve)
Accessory cephalic vein
Branches of medial cutaneous nerve of forearm
Basilic vein
Lateral cutaneous nerve of forearm (terminal part of musculocutaneous nerve)
Median cubital vein
Intermediate (median) antebrachial vein
Basilic vein
Perforating veins
Cephalic vein
Lateral supraclavicular nerve
Acromial branch of thoracoacromial vein
Superficial branches of posterior circumflex humeral vein
Intercosto-brachial nerve
Medial cutaneous nerve of arm
Superior lateral cutaneous nerve of arm (from axillary nerve)
Posterior cutaneous nerve of arm (from radial nerve)
Inferior lateral cutaneous nerve of arm (from radial nerve)
Posterior cutaneous nerve of forearm (from radial nerve)
Branches of medial cutaneous nerve of forearm
Branches of lateral cutaneous nerve of forearm (terminal part of musculocutaneous nerve)
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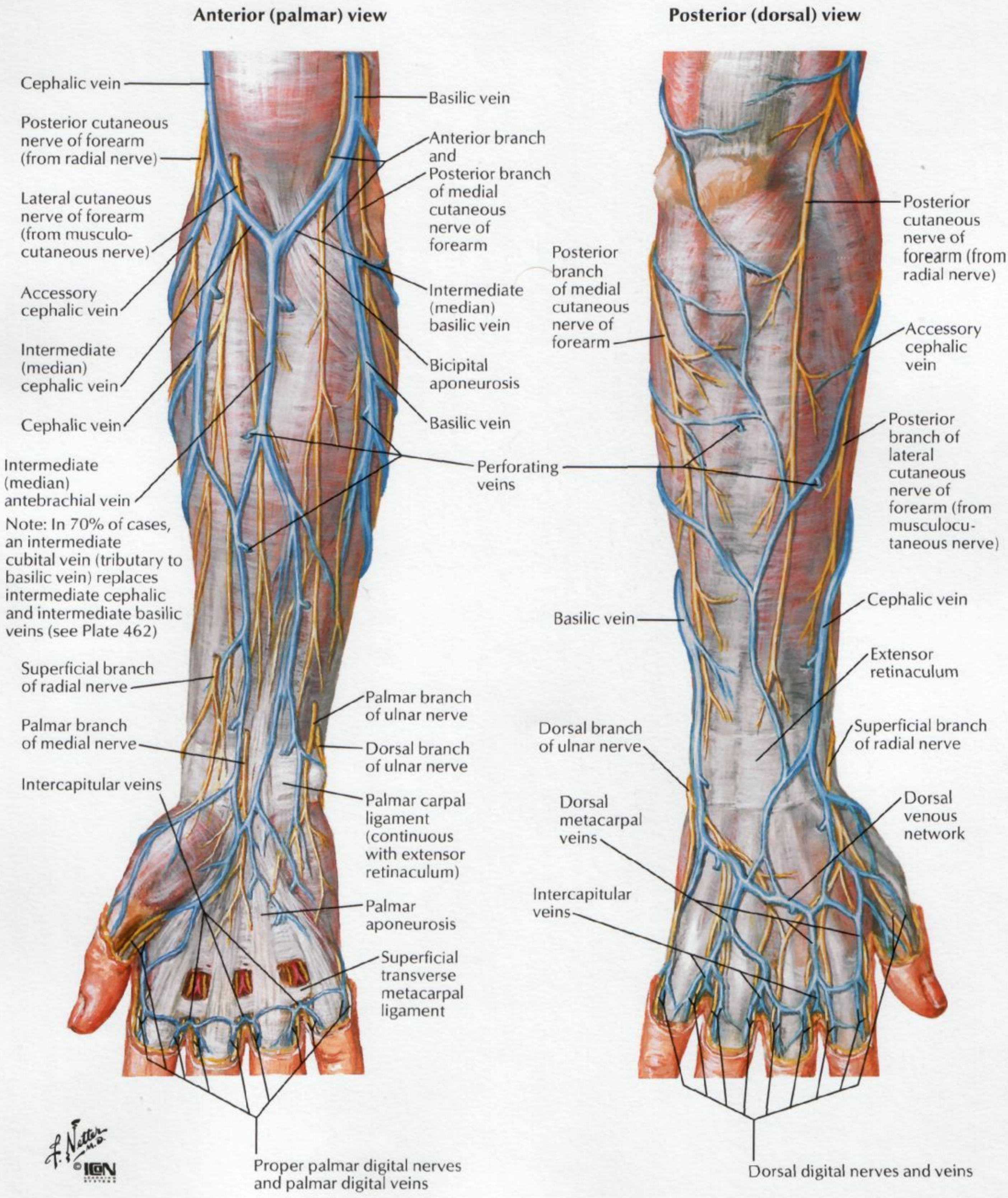
Cutaneous Nerves and Superficial Veins of Forearm


Anterior (palmar) view
Cephalic vein
Posterior cutaneous nerve of forearm (from radial nerve)
Lateral cutaneous nerve of forearm (from musculocutaneous nerve)
Accessory cephalic vein
Intermediate (median) cephalic vein
Cephalic vein
Intermediate (median) antebrachial vein
Superficial branch of radial nerve
Palmar branch of medial nerve
Intercapitular veins
Basilic vein
Anterior branch and Posterior branch of medial cutaneous nerve of forearm
Intermediate (median) basilic vein
Bicipital aponeurosis
Basilic vein
Perforating veins
Palmar branch of ulnar nerve
Dorsal branch of ulnar nerve
Palmar carpal ligament (continuous with extensor retinaculum)
Palmar aponeurosis
Superficial transverse metacarpal ligament
Proper palmar digital nerves and palmar digital veins
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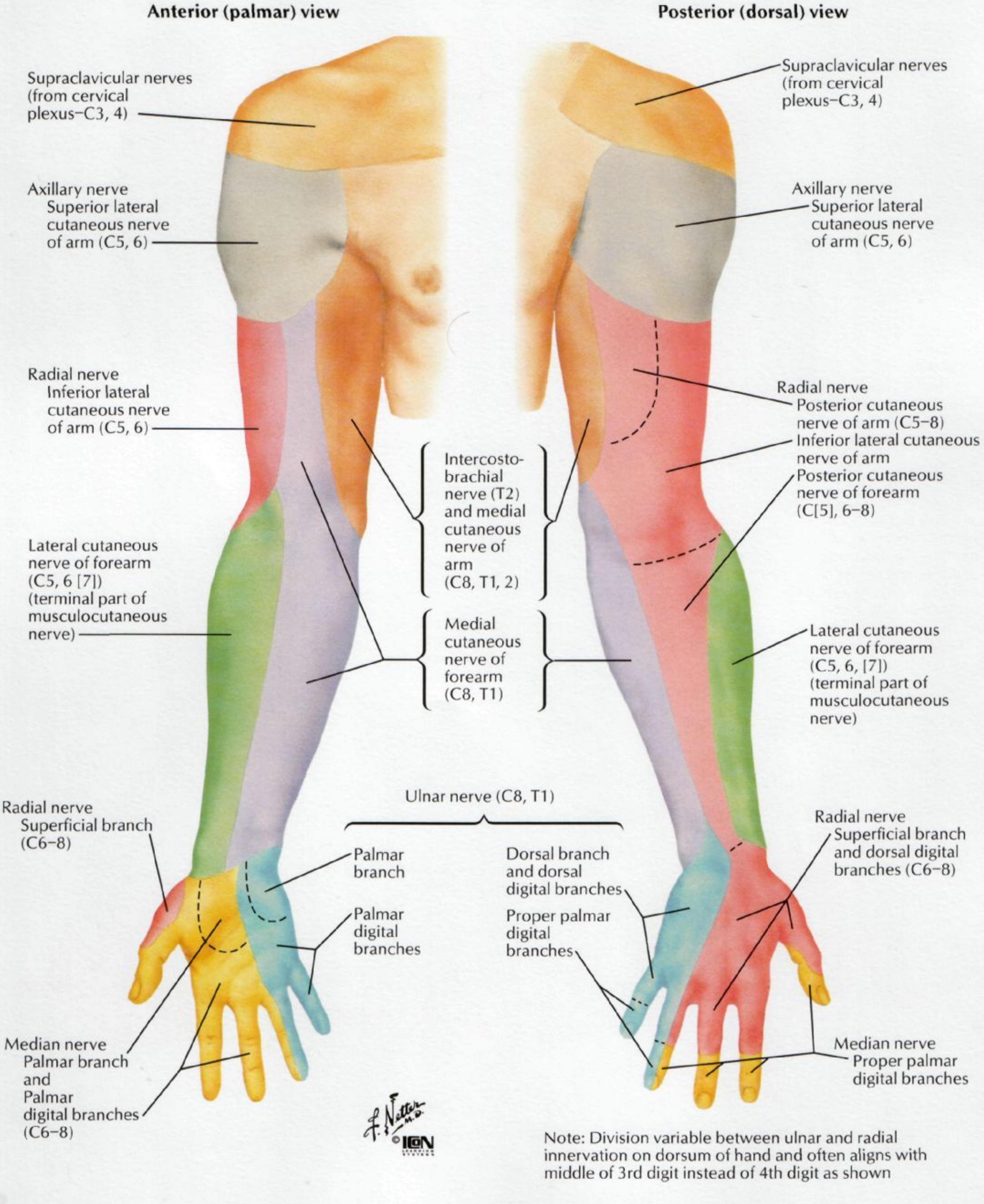
Posterior (dorsal) view
Posterior branch of medial cutaneous nerve of forearm
Basilic vein
Dorsal branch of ulnar nerve
Dorsal metacarpal veins
Intercapitular veins
Posterior cutaneous nerve of forearm (from radial nerve)
Accessory cephalic vein
Posterior branch of lateral cutaneous nerve of forearm (from musculocutaneous nerve)
Cephalic vein
Extensor retinaculum
Superficial branch of radial nerve
Dorsal venous network
Dorsal digital nerves and veins

Note: In 70% of cases, an intermediate cubital vein (tributary to basilic vein) replaces intermediate cephalic and intermediate basilic veins (see Plate 462)

Cutaneous Innervation of Upper Limb


Anterior (palmar) view
Posterior (dorsal) view
Supraclavicular nerves (from cervical plexus–C3, 4)
Axillary nerve
Superior lateral cutaneous nerve of arm (C5, 6)
Radial nerve
Inferior lateral cutaneous nerve of arm (C5, 6)
Lateral cutaneous nerve of forearm (C5, 6 [7]) (terminal part of musculocutaneous nerve)
Radial nerve
Superficial branch (C6–8)
Median nerve
Palmar branch and Palmar digital branches (C6–8)
Supraclavicular nerves (from cervical plexus–C3, 4)
Axillary nerve
Superior lateral cutaneous nerve of arm (C5, 6)
Radial nerve
Posterior cutaneous nerve of arm (C5–8)
Inferior lateral cutaneous nerve of arm
Posterior cutaneous nerve of forearm (C[5], 6–8)
Lateral cutaneous nerve of forearm (C5, 6, [7]) (terminal part of musculocutaneous nerve)
Intercostobrachial nerve (T2) and medial cutaneous nerve of arm (C8, T1, 2)
Medial cutaneous nerve of forearm (C8, T1)
Ulnar nerve (C8, T1)
Palmar branch
Palmar digital branches
Dorsal branch and dorsal digital branches
Proper palmar digital branches
Radial nerve
Superficial branch and dorsal digital branches (C6–8)
Median nerve
Proper palmar digital branches
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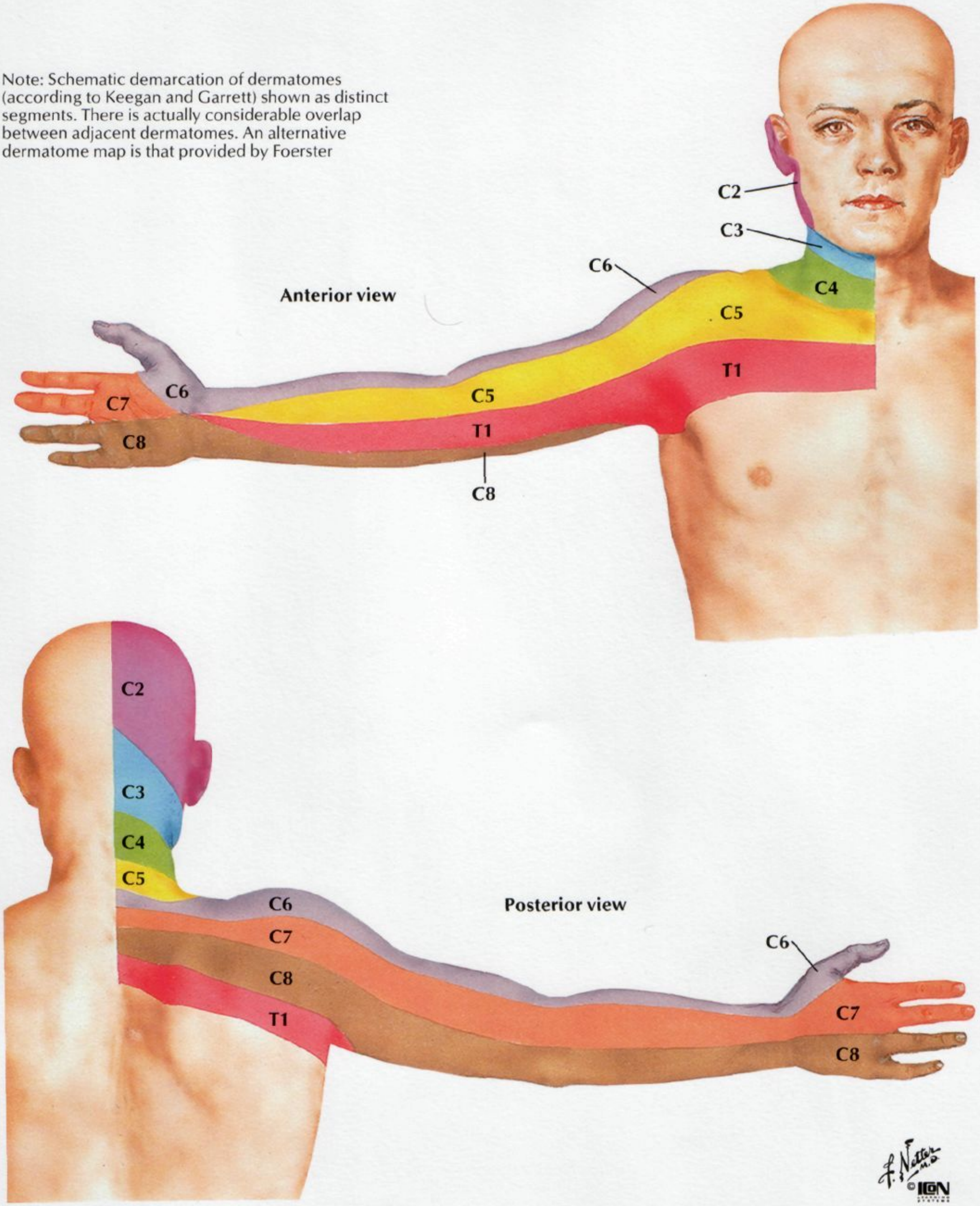
Note: Division variable between ulnar and radial innervation on dorsum of hand and often aligns with middle of 3rd digit instead of 4th digit as shown

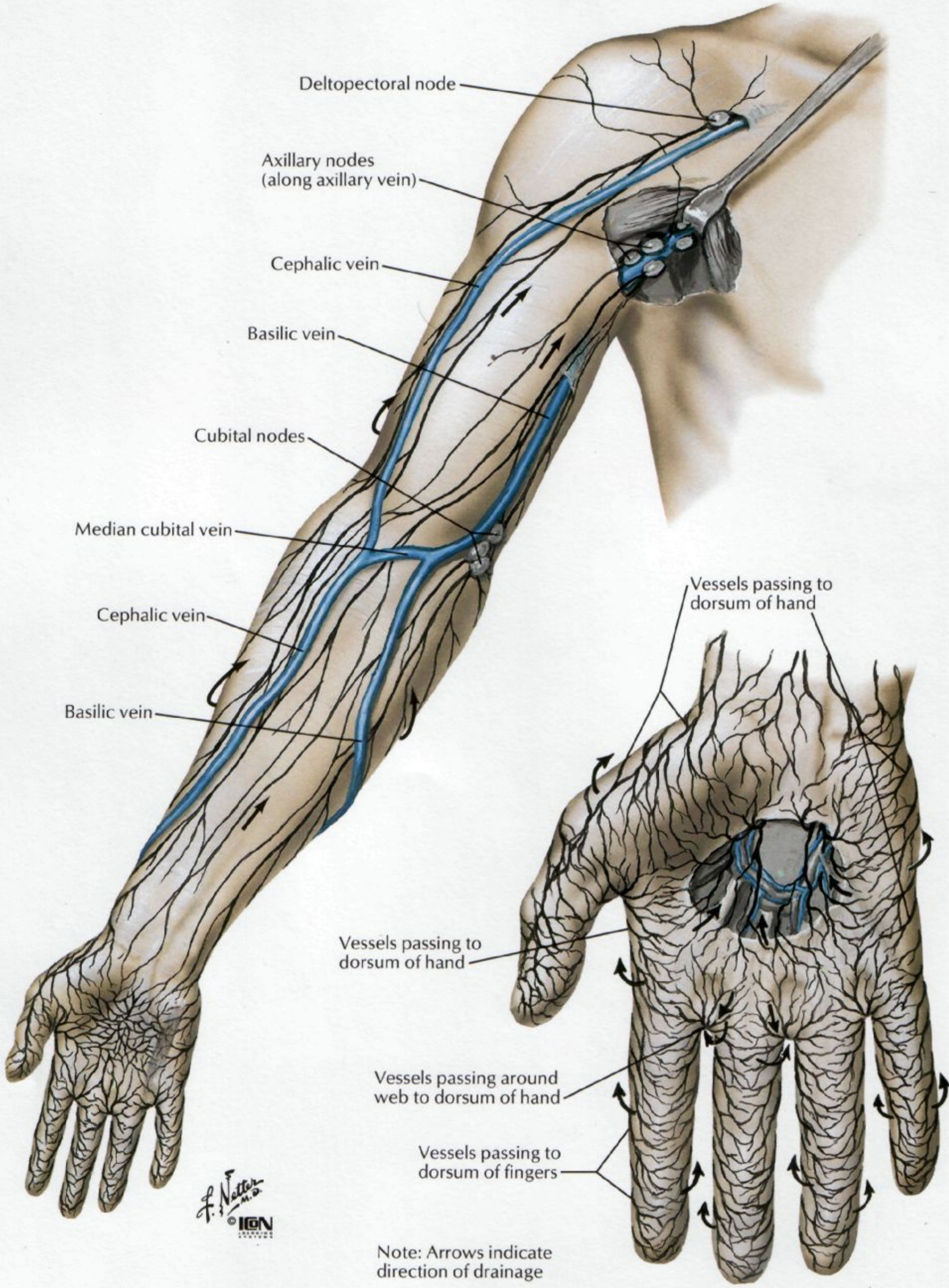
Dermatomes of Upper Limb

Note: Schematic demarcation of dermatomes (according to Keegan and Garrett) shown as distinct segments. There is actually considerable overlap between adjacent dermatomes. An alternative dermatome map is that provided by Foerster



Lymph Vessels and Nodes of Upper Limb

SEE ALSO PLATES 177, 451


Deltopectoral node
Axillary nodes (along axillary vein)
Cephalic vein
Basilic vein
Cubital nodes
Median cubital vein
Cephalic vein
Basilic vein
Vessels passing to dorsum of hand
Vessels passing to dorsum of hand
Vessels passing around web to dorsum of hand
Vessels passing to dorsum of fingers

Note: Arrows indicate direction of drainage

Section VII
LOWER LIMB

SURFACE ANATOMY
Plate 467

467. Lower Limb

HIP AND THIGH
Plates 468–487

468. Hip (Coxal) Bone
469. Hip Joint
470. Hip Joint: Anteroposterior Radiograph
471. Femur
472. Bony Attachments of Muscles of Hip and Thigh: Anterior View
473. Bony Attachments of Muscles of Hip and Thigh: Posterior View
474. Muscles of Thigh: Anterior Views
475. Muscles of Thigh: Anterior Views (*continued*)
476. Muscles of Hip and Thigh: Lateral View
477. Muscles of Hip and Thigh: Posterior Views
478. Psoas and Iliacus Muscles
479. Lumbosacral and Coccygeal Plexuses
480. Lumbar Plexus
481. Sacral and Coccygeal Plexuses
482. Arteries and Nerves of Thigh: Anterior Views
483. Arteries and Nerves of Thigh: Anterior Views (*continued*)
484. Arteries and Nerves of Thigh: Posterior View
485. Nerves of Hip and Buttock
486. Arteries of Femoral Head and Neck
487. Thigh: Serial Cross Sections

KNEE

Plates 488–494

488. Knee: Lateral and Medial Views
489. Knee: Anterior Views
490. Knee: Interior
491. Knee: Cruciate and Collateral Ligaments
492. Knee: Anteroposterior Radiograph
493. Knee: Posterior and Sagittal Views
494. Arteries of Thigh and Knee: Schema

LEG

Plates 495–504

495. Tibia and Fibula
496. Tibia and Fibula (*continued*)
497. Attachments of Muscles of Leg
498. Muscles of Leg (Superficial Dissection): Posterior View
499. Muscles of Leg (Intermediate Dissection): Posterior View
500. Muscles of Leg (Deep Dissection): Posterior View
501. Muscles of Leg (Superficial Dissection): Anterior View
502. Muscles of Leg (Deep Dissection): Anterior View
503. Muscles of Leg: Lateral View
504. Leg: Cross Sections and Fascial Compartments

ANKLE AND FOOT

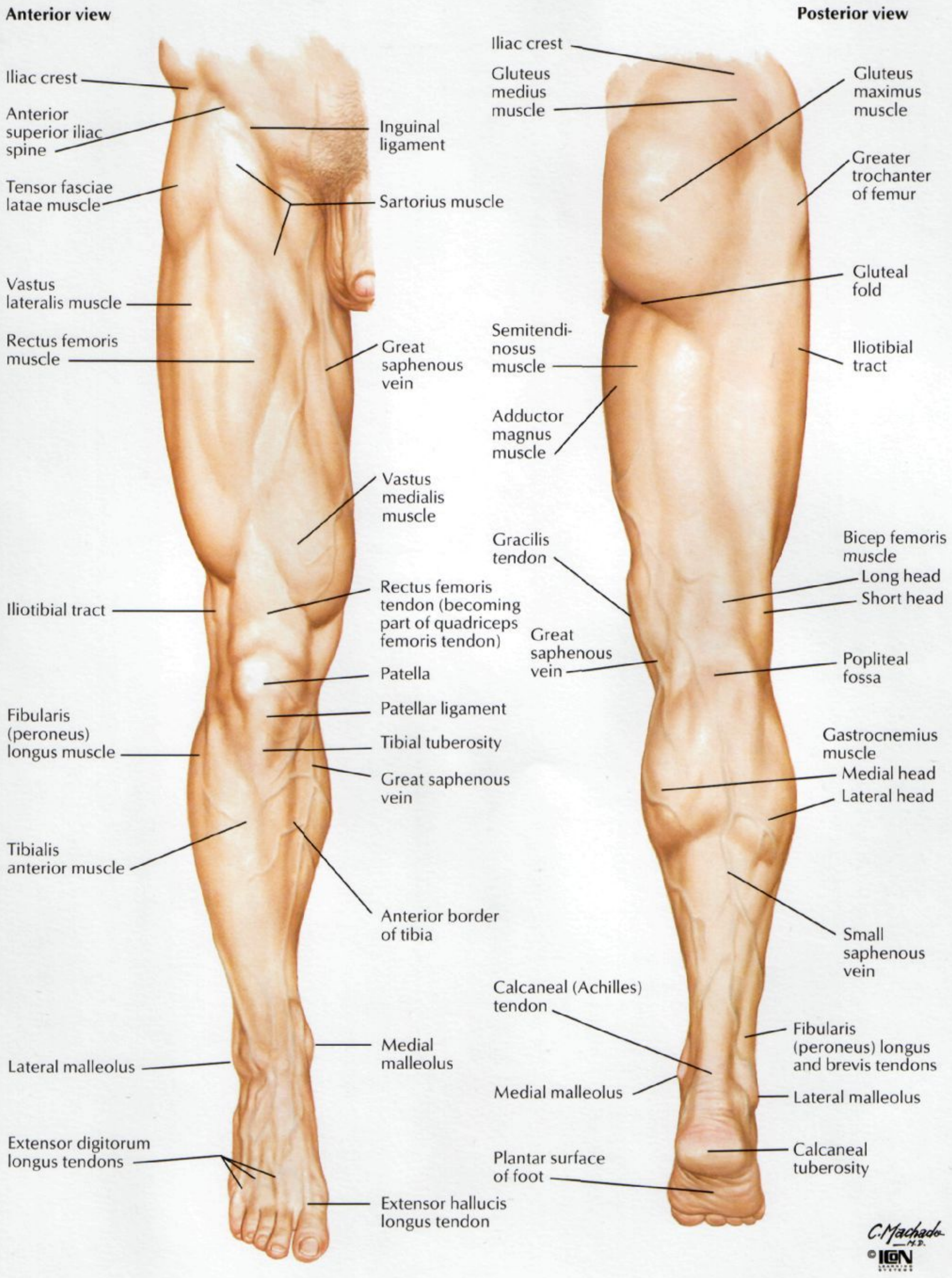
Plates 505–519

505. Bones of Foot
506. Bones of Foot (*continued*)
507. Calcaneus
508. Ankle: Radiographs
509. Ligaments and Tendons of Ankle
510. Ligaments and Tendons of Foot: Plantar View
511. Tendon Sheaths of Ankle
512. Muscles of Dorsum of Foot: Superficial Dissection
513. Dorsum of Foot: Deep Dissection
514. Sole of Foot: Superficial Dissection
515. Muscles of Sole of Foot: First Layer
516. Muscles of Sole of Foot: Second Layer
517. Muscles of Sole of Foot: Third Layer
518. Interosseous Muscles and Deep Arteries of Foot
519. Interosseous Muscles of Foot

NEUROVASCULATURE

Plates 520–528

520. Femoral Nerve and Lateral Cutaneous Nerve of Thigh
521. Obturator Nerve
522. Sciatic Nerve and Posterior Cutaneous Nerve of Thigh
523. Tibial Nerve
524. Common Fibular (Peroneal) Nerve
525. Dermatomes of Lower Limb
526. Superficial Nerves and Veins of Lower Limb: Anterior View
527. Superficial Nerves and Veins of Lower Limb: Posterior View
528. Lymph Vessels and Nodes of Lower Limb


Anterior view
Iliac crest
Anterior superior iliac spine
Tensor fasciae latae muscle
Vastus lateralis muscle
Rectus femoris muscle
Iliotibial tract
Fibularis (peroneus) longus muscle
Tibialis anterior muscle
Lateral malleolus
Extensor digitorum longus tendons
Inguinal ligament
Sartorius muscle
Great saphenous vein
Vastus medialis muscle
Rectus femoris tendon (becoming part of quadriceps femoris tendon)
Patella
Patellar ligament
Tibial tuberosity
Great saphenous vein
Anterior border of tibia
Medial malleolus
Extensor hallucis longus tendon
Posterior view
Iliac crest
Gluteus medius muscle
Semitendinosus muscle
Adductor magnus muscle
Gracilis tendon
Great saphenous vein
Calcaneal (Achilles) tendon
Medial malleolus
Plantar surface of foot
Gluteus maximus muscle
Greater trochanter of femur
Gluteal fold
Iliotibial tract
Bicep femoris muscle
Long head
Short head
Popliteal fossa
Gastrocnemius muscle
Medial head
Lateral head
Small saphenous vein
Fibularis (peroneus) longus and brevis tendons
Lateral malleolus
Calcaneal tuberosity
C. Machado M.D.
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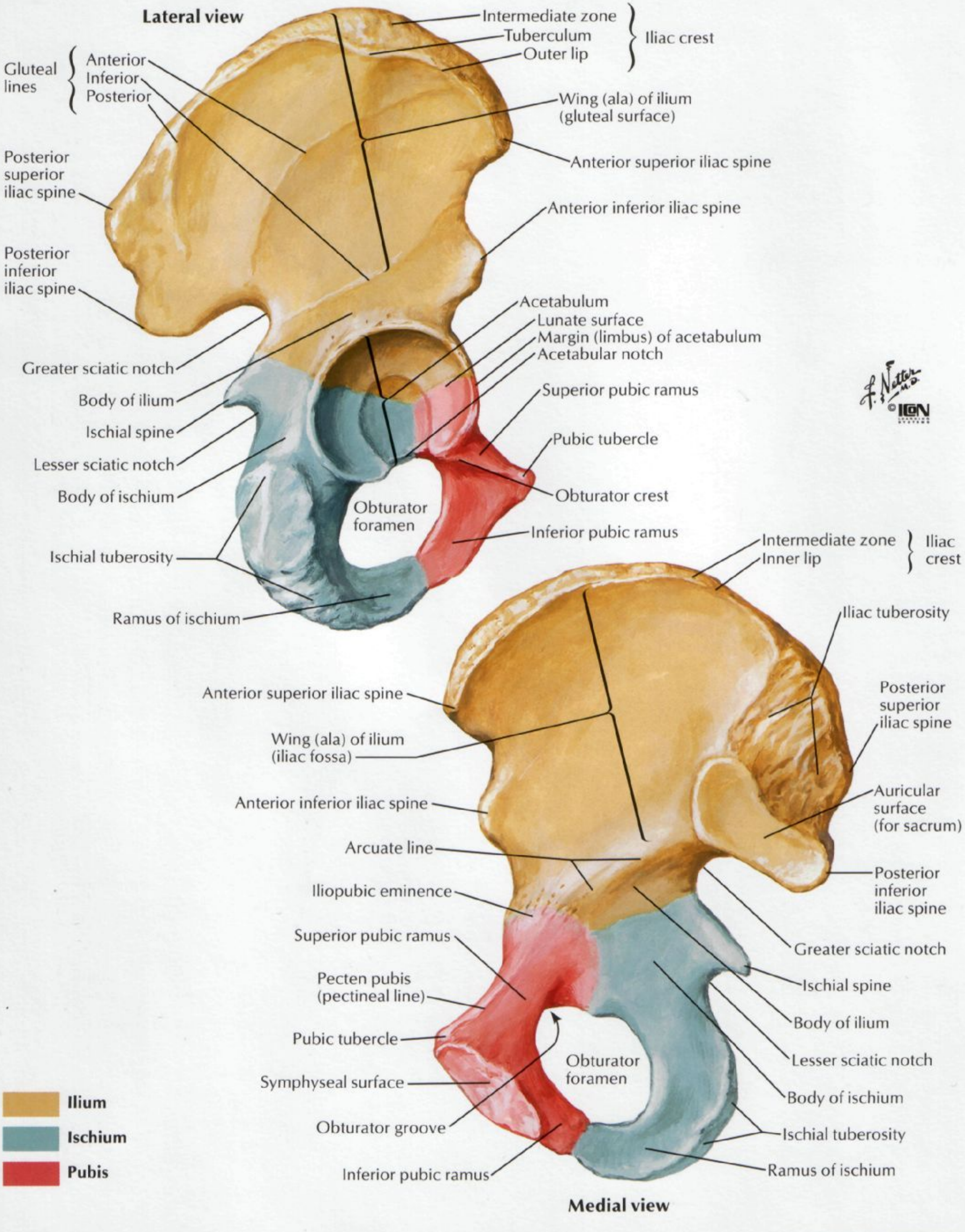
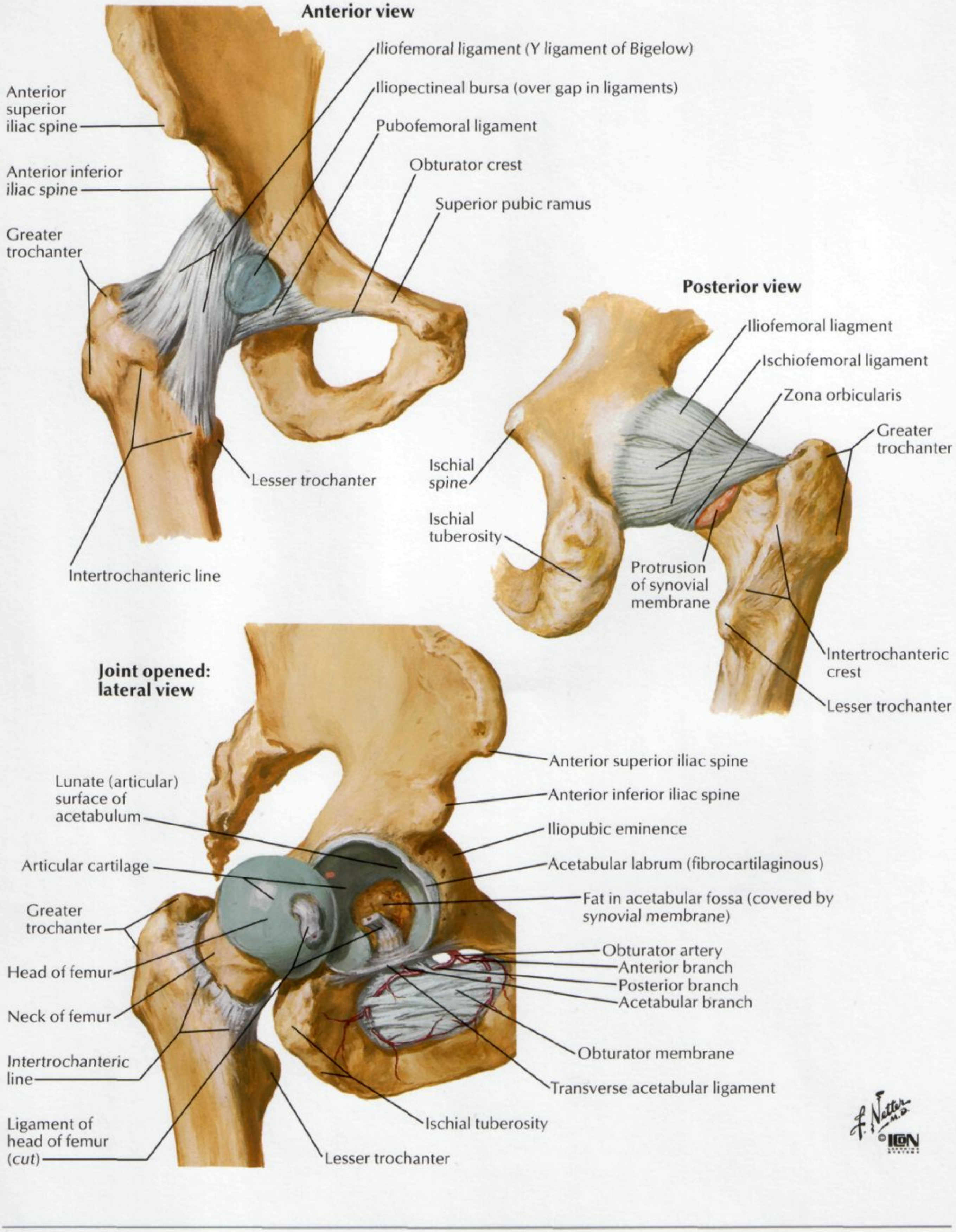
Hip (Coxal) Bone

SEE ALSO PLATES 240, 340, 341



Hip Joint


Anterior view
Iliofemoral ligament (Y ligament of Bigelow)
Iliopectineal bursa (over gap in ligaments)
Pubofemoral ligament
Obturator crest
Superior pubic ramus
Anterior superior iliac spine
Anterior inferior iliac spine
Greater trochanter
Lesser trochanter
Intertrochanteric line
Posterior view
Iliofemoral liagment
Ischiofemoral ligament
Zona orbicularis
Greater trochanter
Ischial spine
Ischial tuberosity
Protrusion of synovial membrane
Intertrochanteric crest
Lesser trochanter
Joint opened: lateral view
Anterior superior iliac spine
Anterior inferior iliac spine
Iliopubic eminence
Acetabular labrum (fibrocartilaginous)
Fat in acetabular fossa (covered by synovial membrane)
Obturator artery
Anterior branch
Posterior branch
Acetabular branch
Obturator membrane
Transverse acetabular ligament
Ischial tuberosity
Lesser trochanter
Lunate (articular) surface of acetabulum
Articular cartilage
Greater trochanter
Head of femur
Neck of femur
Intertrochanteric line
Ligament of head of femur (*cut*)
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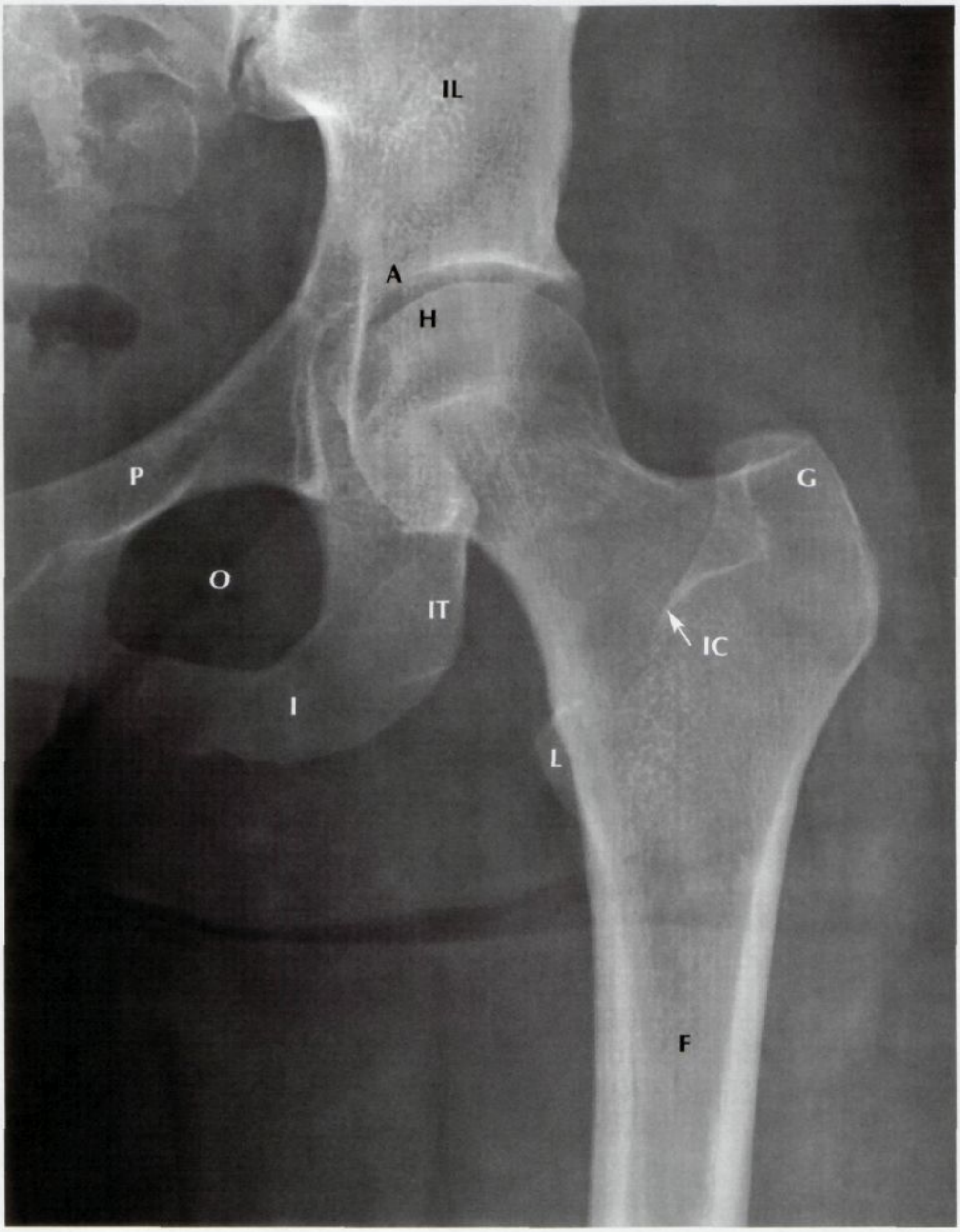
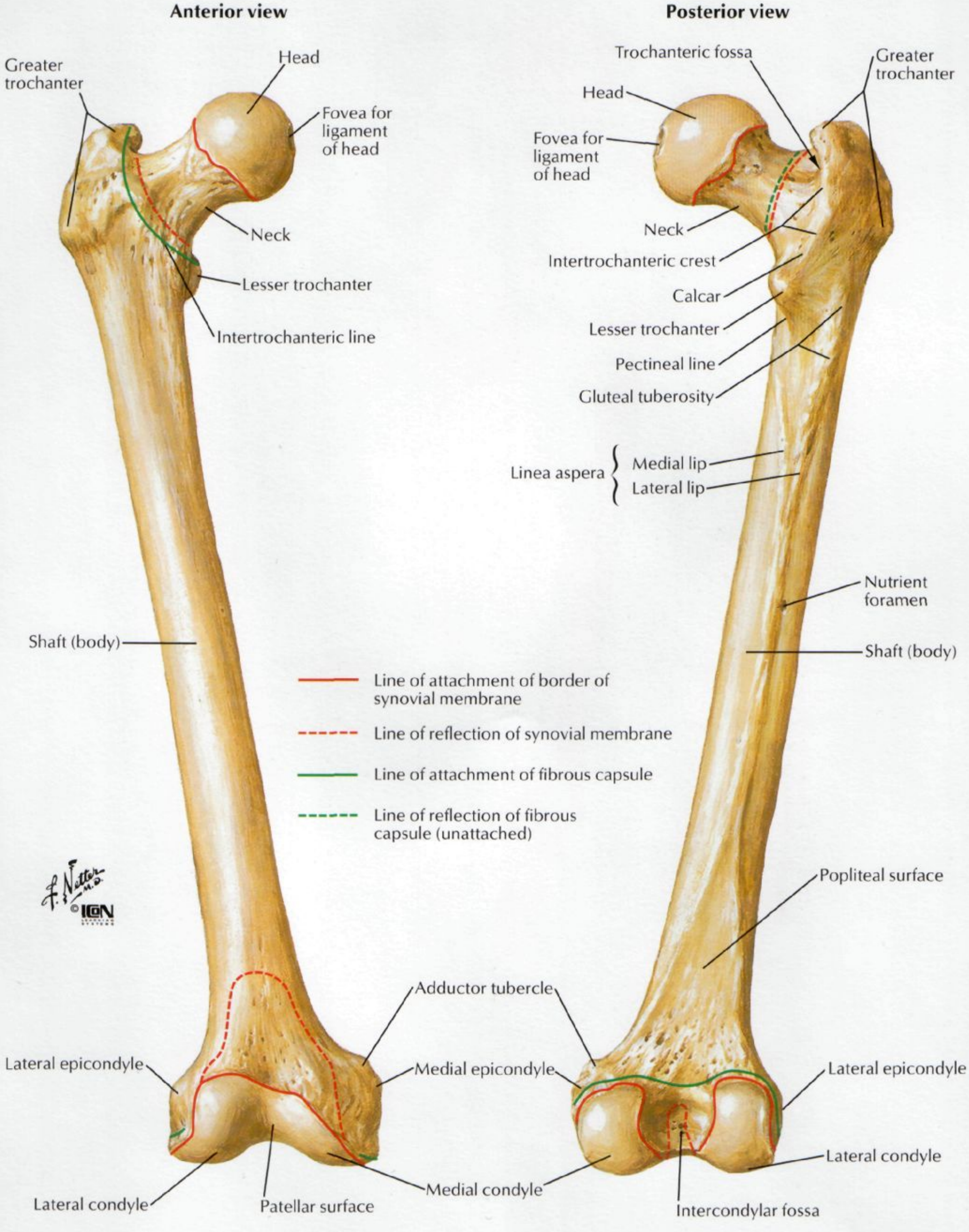
Hip Joint: Anteroposterior Radiograph

SEE ALSO PLATES 469, 471



A	Acetabulum
F	Femur
G	Greater trochanter
H	Head of femur
I	Ischium
IC	Intertrochanteric crest
IL	Ileum
IT	Ischial tuberosity
L	Lesser trochanter
O	Obturator foramen
P	Pubis (superior ramus)

Femur


Anterior view
Greater trochanter
Head
Fovea for ligament of head
Neck
Lesser trochanter
Intertrochanteric line
Shaft (body)
Lateral epicondyle
Adductor tubercle
Medial epicondyle
Lateral condyle
Patellar surface
Medial condyle
Posterior view
Trochanteric fossa
Greater trochanter
Head
Fovea for ligament of head
Neck
Intertrochanteric crest
Calcar
Lesser trochanter
Pectineal line
Gluteal tuberosity
Linea aspera
Medial lip
Lateral lip
Nutrient foramen
Shaft (body)
Popliteal surface
Adductor tubercle
Medial epicondyle
Lateral epicondyle
Lateral condyle
Medial condyle
Intercondylar fossa
— Line of attachment of border of synovial membrane
- - - Line of reflection of synovial membrane
— Line of attachment of fibrous capsule
- - - Line of reflection of fibrous capsule (unattached)
F. Netter M.D.
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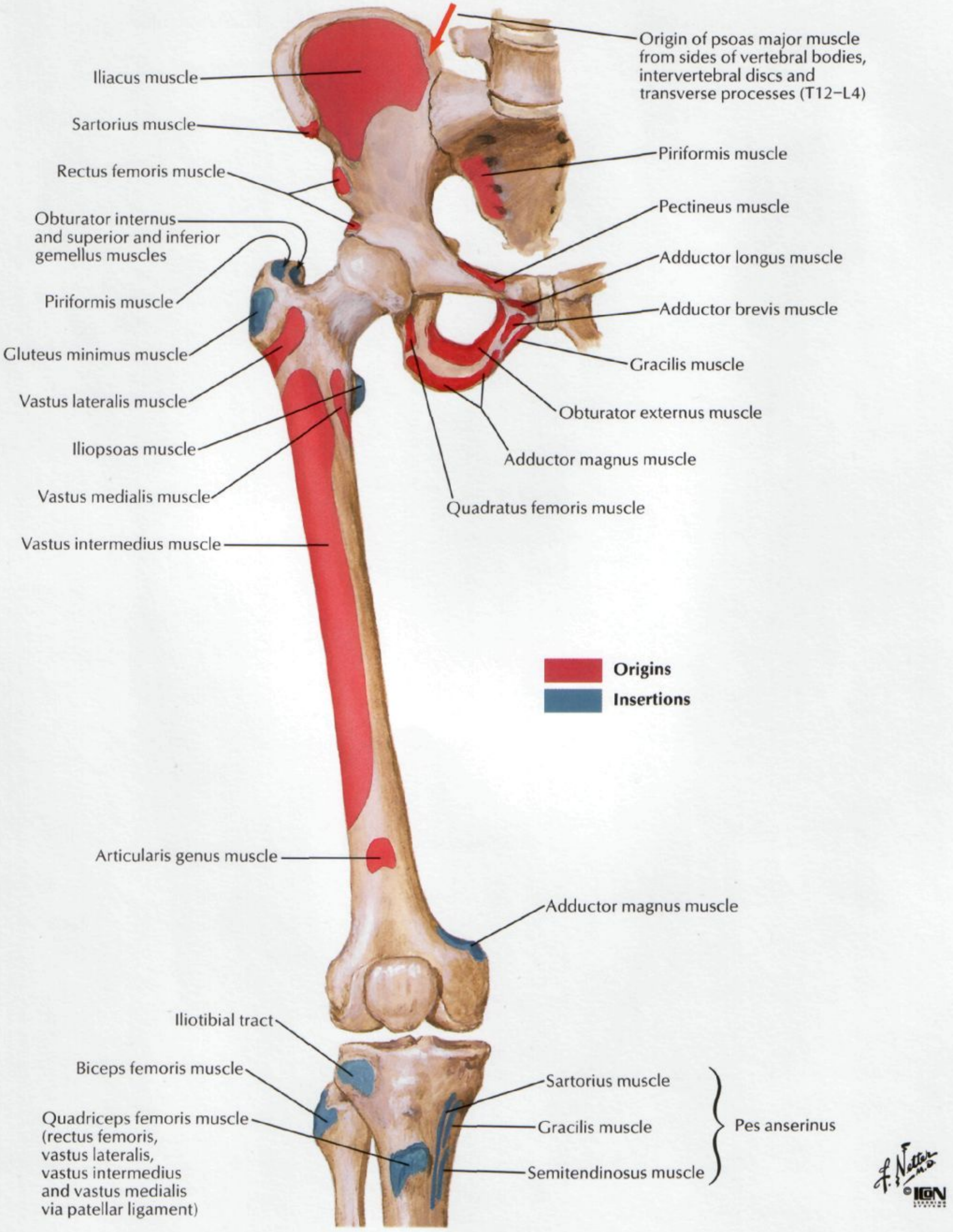
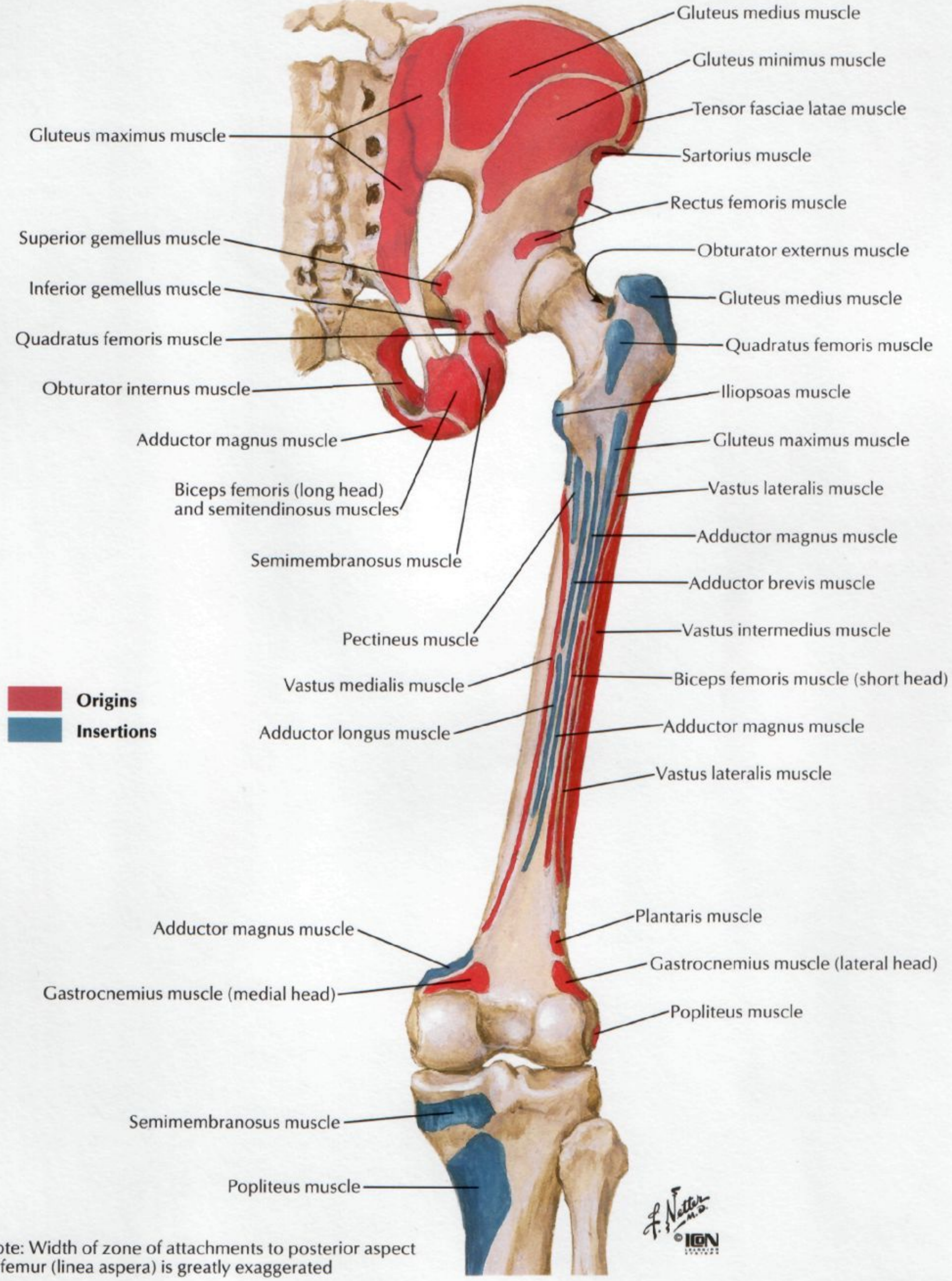
Bony Attachments of Muscles of Hip and Thigh: Anterior View

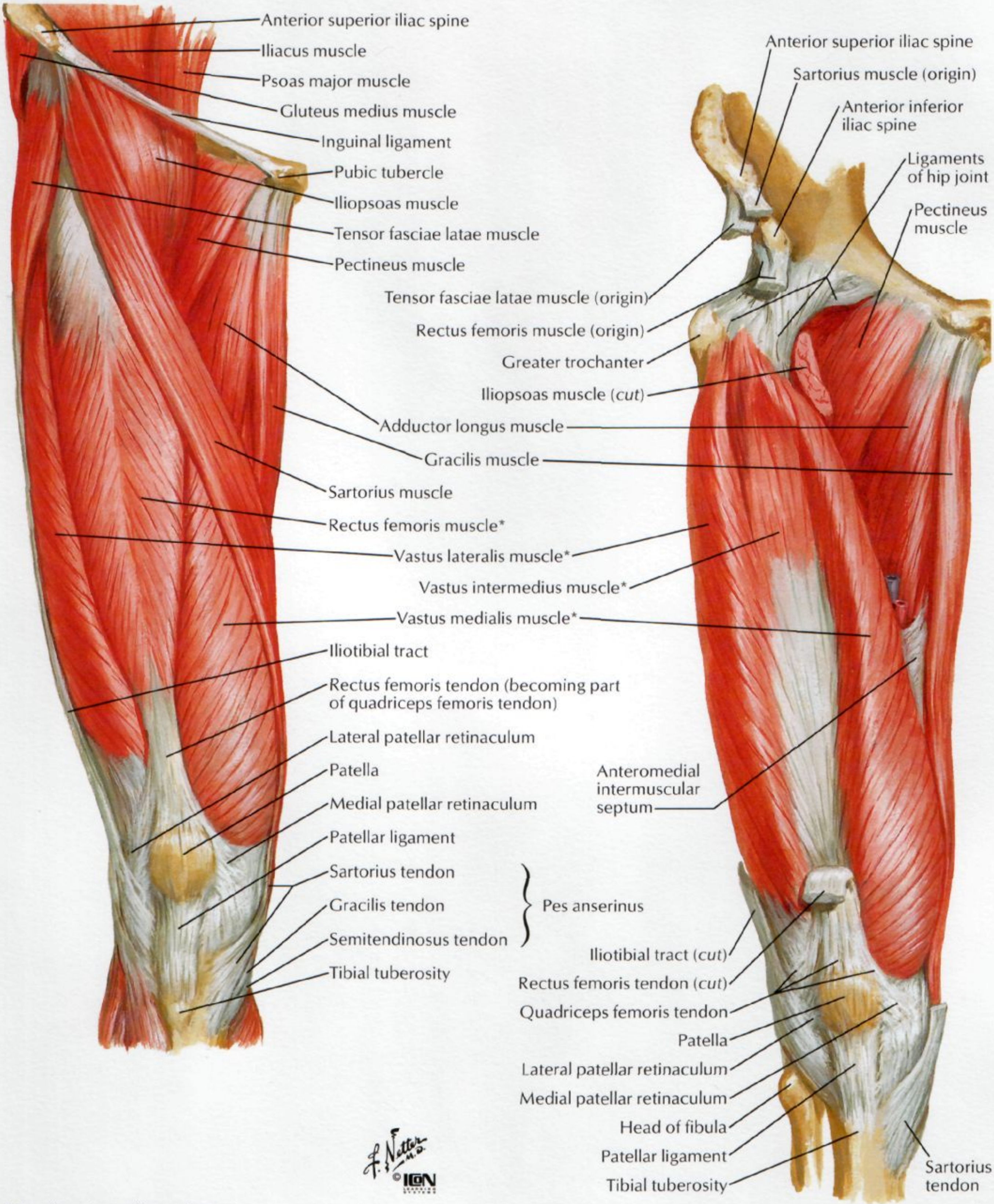


Bony Attachments of Muscles of Hip and Thigh: Posterior View



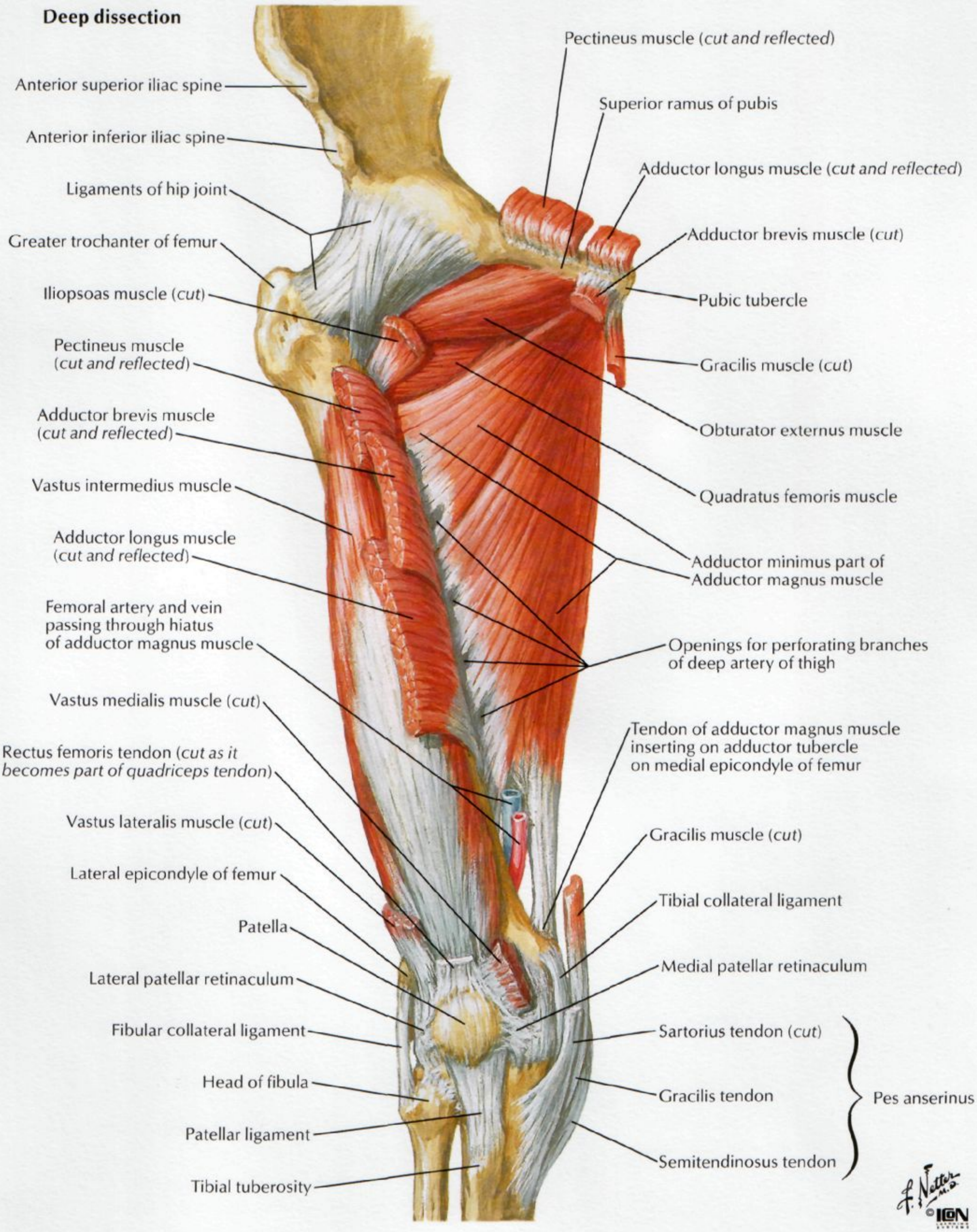
Note: Width of zone of attachments to posterior aspect of femur (linea aspera) is greatly exaggerated

Muscles of Thigh: Anterior Views



*Muscles of quadriceps femoris

Muscles of Thigh: Anterior Views (continued)



Deep dissection

Anterior superior iliac spine
Anterior inferior iliac spine
Ligaments of hip joint
Greater trochanter of femur
Iliopsoas muscle (*cut*)
Pectineus muscle (*cut and reflected*)
Adductor brevis muscle (*cut and reflected*)
Vastus intermedius muscle
Adductor longus muscle (*cut and reflected*)
Femoral artery and vein passing through hiatus of adductor magnus muscle
Vastus medialis muscle (*cut*)
Rectus femoris tendon (*cut as it becomes part of quadriceps tendon*)
Vastus lateralis muscle (*cut*)
Lateral epicondyle of femur
Patella
Lateral patellar retinaculum
Fibular collateral ligament
Head of fibula
Patellar ligament
Tibial tuberosity
Pectineus muscle (*cut and reflected*)
Superior ramus of pubis
Adductor longus muscle (*cut and reflected*)
Adductor brevis muscle (*cut*)
Pubic tubercle
Gracilis muscle (*cut*)
Obturator externus muscle
Quadratus femoris muscle
Adductor minimus part of Adductor magnus muscle
Openings for perforating branches of deep artery of thigh
Tendon of adductor magnus muscle inserting on adductor tubercle on medial epicondyle of femur
Gracilis muscle (*cut*)
Tibial collateral ligament
Medial patellar retinaculum
Sartorius tendon (*cut*)
Gracilis tendon
Semitendinosus tendon
Pes anserinus
F. Netter M.D.
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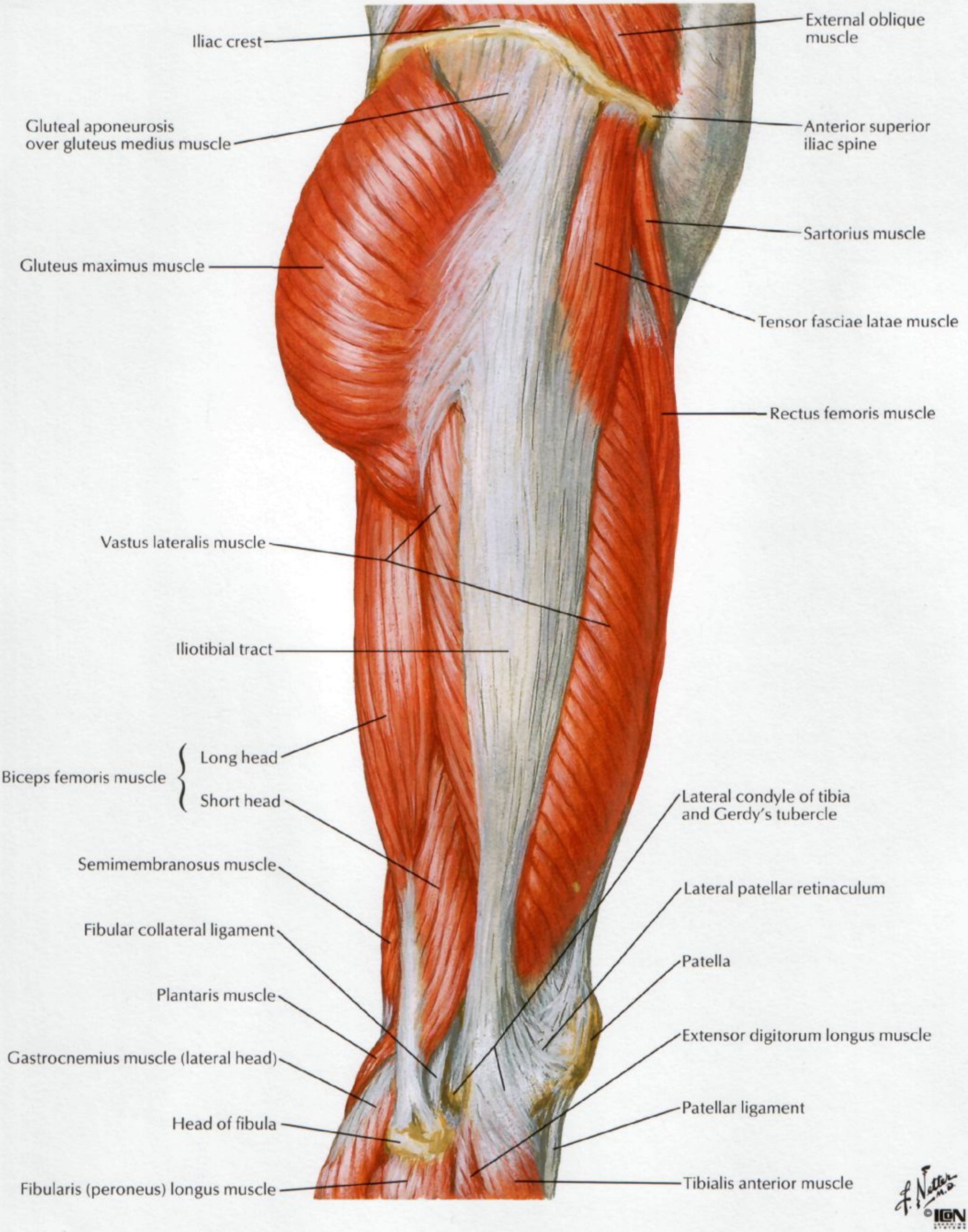
Muscles of Hip and Thigh: Lateral View


Iliac crest
External oblique muscle
Gluteal aponeurosis over gluteus medius muscle
Anterior superior iliac spine
Sartorius muscle
Gluteus maximus muscle
Tensor fasciae latae muscle
Rectus femoris muscle
Vastus lateralis muscle
Iliotibial tract
Biceps femoris muscle
Long head
Short head
Lateral condyle of tibia and Gerdy's tubercle
Semimembranosus muscle
Lateral patellar retinaculum
Fibular collateral ligament
Patella
Plantaris muscle
Extensor digitorum longus muscle
Gastrocnemius muscle (lateral head)
Patellar ligament
Head of fibula
Fibularis (peroneus) longus muscle
Tibialis anterior muscle
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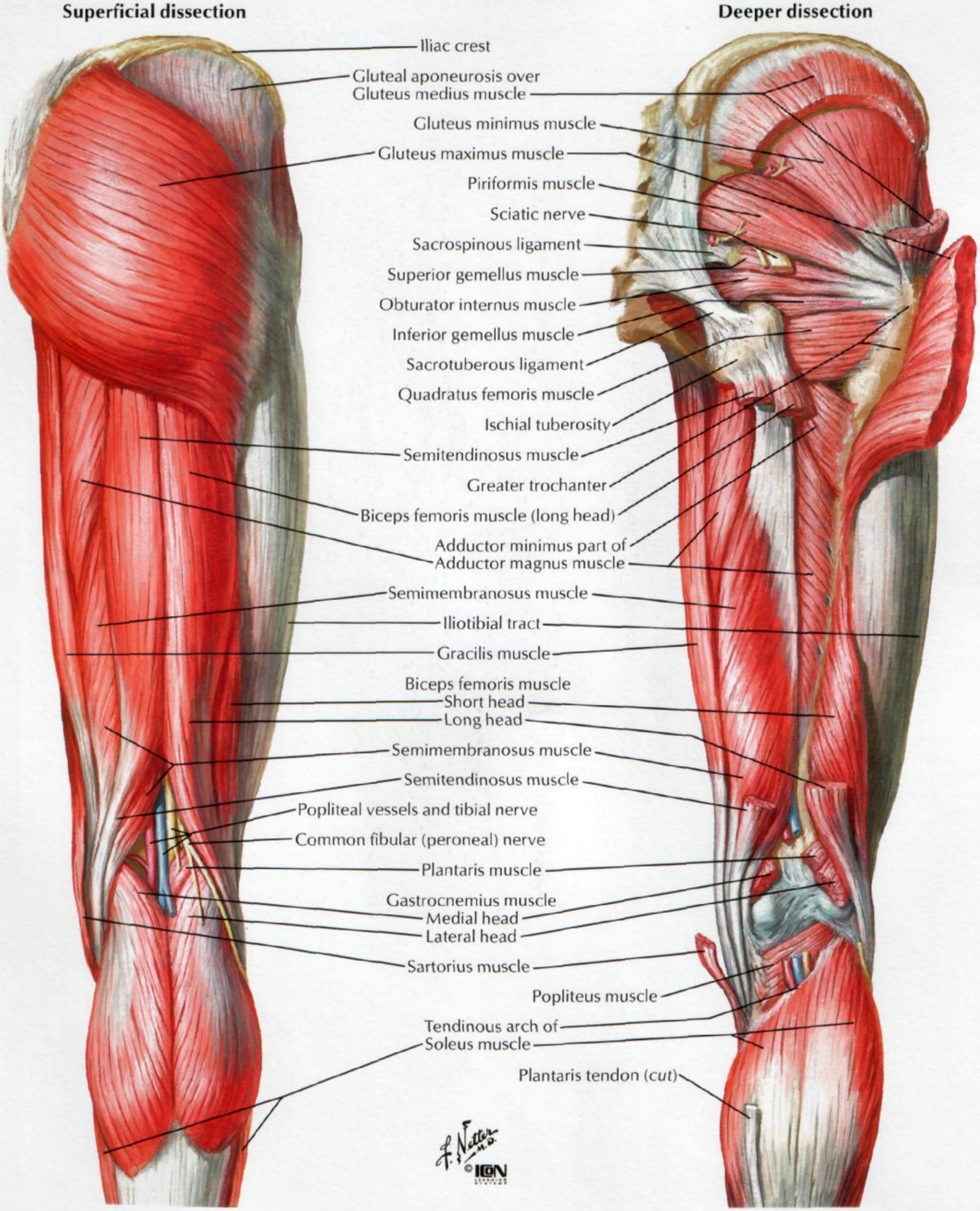
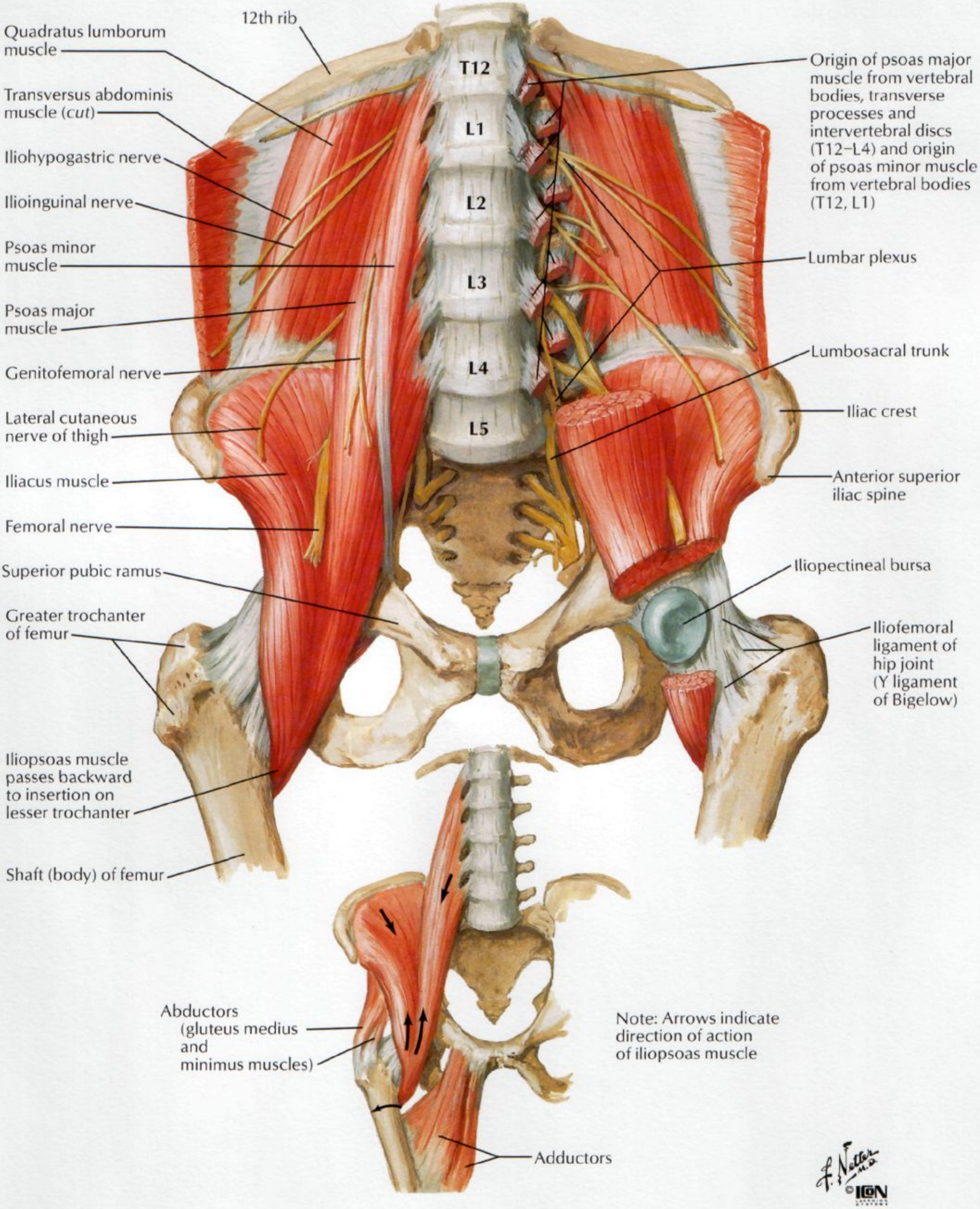
Muscles of Hip and Thigh: Posterior Views

FOR PIRIFORMIS AND OBTURATOR INTERNUS SEE ALSO PLATES 343, 344; FOR OBTURATOR EXTERNUS SEE PLATE 483



Psoas and Iliacus Muscles

SEE ALSO PLATE 255


12th rib
Quadratus lumborum muscle
Transversus abdominis muscle (*cut*)
Iliohypogastric nerve
Ilioinguinal nerve
Psoas minor muscle
Psoas major muscle
Genitofemoral nerve
Lateral cutaneous nerve of thigh
Iliacus muscle
Femoral nerve
Superior pubic ramus
Greater trochanter of femur
Iliopsoas muscle passes backward to insertion on lesser trochanter
Shaft (body) of femur
T12
L1
L2
L3
L4
L5
Origin of psoas major muscle from vertebral bodies, transverse processes and intervertebral discs (T12–L4) and origin of psoas minor muscle from vertebral bodies (T12, L1)
Lumbar plexus
Lumbosacral trunk
Iliac crest
Anterior superior iliac spine
Iliopectineal bursa
Iliofemoral ligament of hip joint (Y ligament of Bigelow)
Abductors (gluteus medius and minimus muscles)
Adductors
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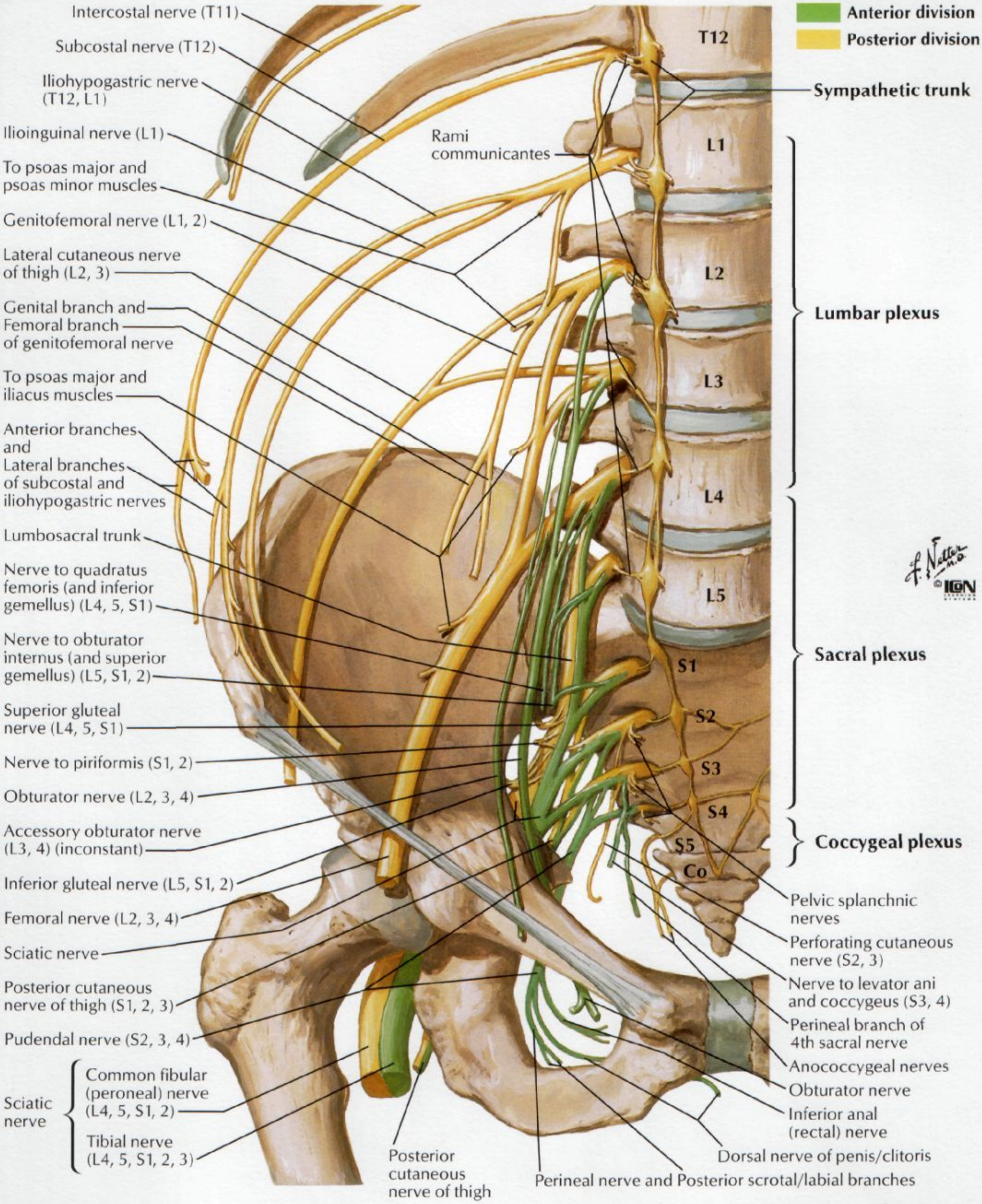
Note: Arrows indicate direction of action of iliopsoas muscle

Lumbosacral and Coccygeal Plexuses


Anterior division
Posterior division
Intercostal nerve (T11)
Subcostal nerve (T12)
Iliohypogastric nerve (T12, L1)
Ilioinguinal nerve (L1)
To psoas major and psoas minor muscles
Genitofemoral nerve (L1, 2)
Lateral cutaneous nerve of thigh (L2, 3)
Genital branch and
Femoral branch
of genitofemoral nerve
To psoas major and iliacus muscles
Anterior branches
and
Lateral branches
of subcostal and iliohypogastric nerves
Lumbosacral trunk
Nerve to quadratus femoris (and inferior gemellus) (L4, 5, S1)
Nerve to obturator internus (and superior gemellus) (L5, S1, 2)
Superior gluteal nerve (L4, 5, S1)
Nerve to piriformis (S1, 2)
Obturator nerve (L2, 3, 4)
Accessory obturator nerve (L3, 4) (inconstant)
Inferior gluteal nerve (L5, S1, 2)
Femoral nerve (L2, 3, 4)
Sciatic nerve
Posterior cutaneous nerve of thigh (S1, 2, 3)
Pudendal nerve (S2, 3, 4)
Sciatic nerve
Common fibular (peroneal) nerve (L4, 5, S1, 2)
Tibial nerve (L4, 5, S1, 2, 3)
Rami communicantes
T12
L1
L2
L3
L4
L5
S1
S2
S3
S4
S5
Co
Sympathetic trunk
Lumbar plexus
Sacral plexus
Coccygeal plexus
F. Netter M.D.
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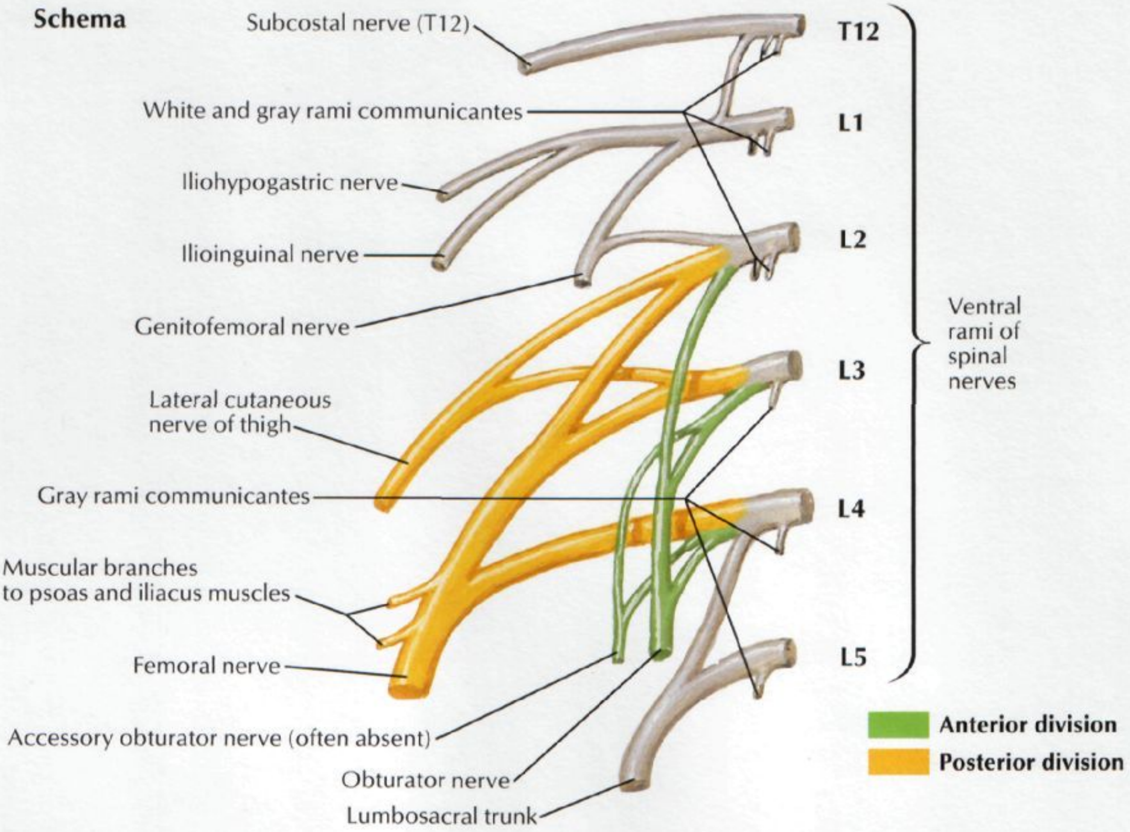
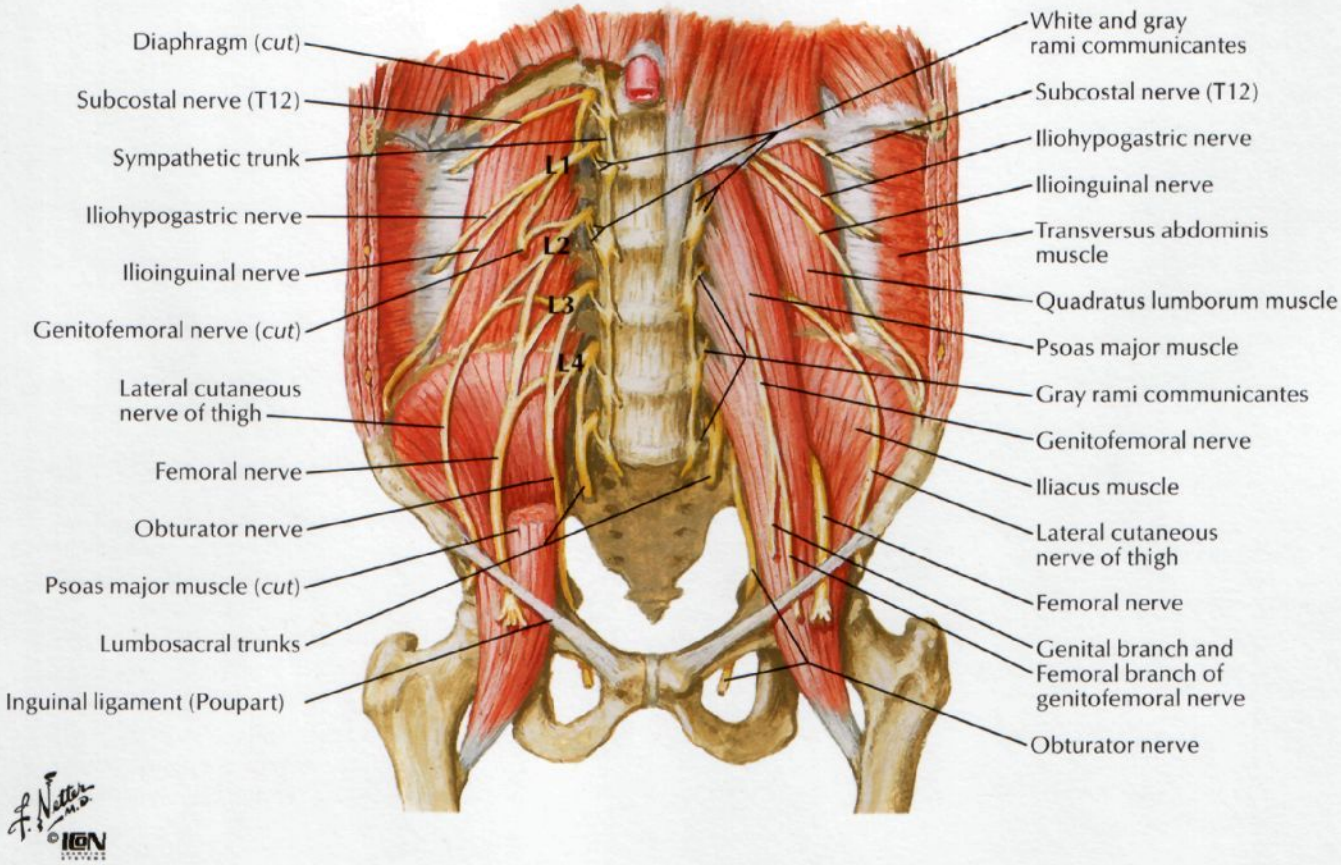
Pelvic splanchnic nerves
Perforating cutaneous nerve (S2, 3)
Nerve to levator ani and coccygeus (S3, 4)
Perineal branch of 4th sacral nerve
Anococcygeal nerves
Obturator nerve
Inferior anal (rectal) nerve
Dorsal nerve of penis/clitoris
Posterior cutaneous nerve of thigh
Perineal nerve and Posterior scrotal/labial branches

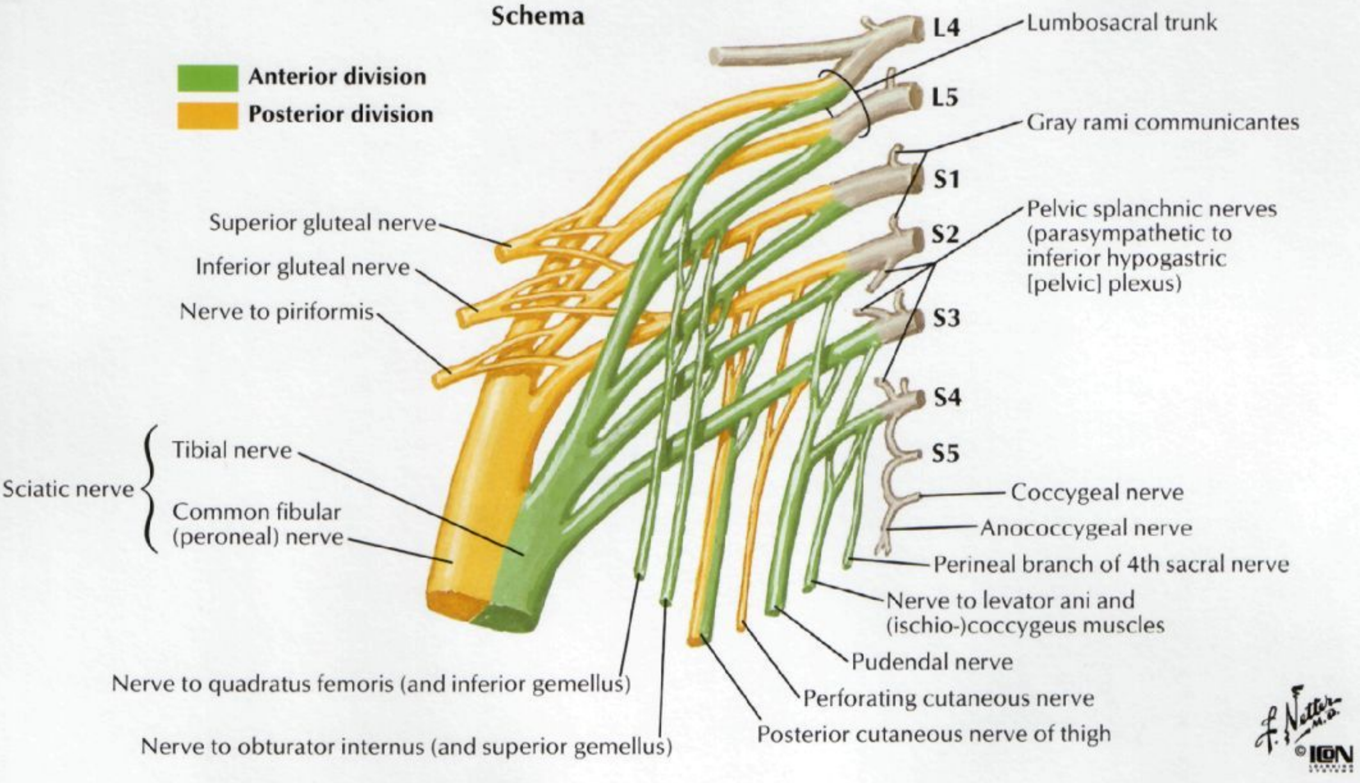
Lumbar Plexus





Sacral and Coccygeal Plexuses

Schema



🟩 Anterior division
🟨 Posterior division
L4
Lumbosacral trunk
L5
Gray rami communicantes
S1
S2
Pelvic splanchnic nerves (parasympathetic to inferior hypogastric [pelvic] plexus)
S3
S4
S5
Superior gluteal nerve
Inferior gluteal nerve
Nerve to piriformis
Sciatic nerve
Tibial nerve
Common fibular (peroneal) nerve
Coccygeal nerve
Anococcygeal nerve
Perineal branch of 4th sacral nerve
Nerve to levator ani and (ischio-)coccygeus muscles
Pudendal nerve
Perforating cutaneous nerve
Posterior cutaneous nerve of thigh
Nerve to quadratus femoris (and inferior gemellus)
Nerve to obturator internus (and superior gemellus)
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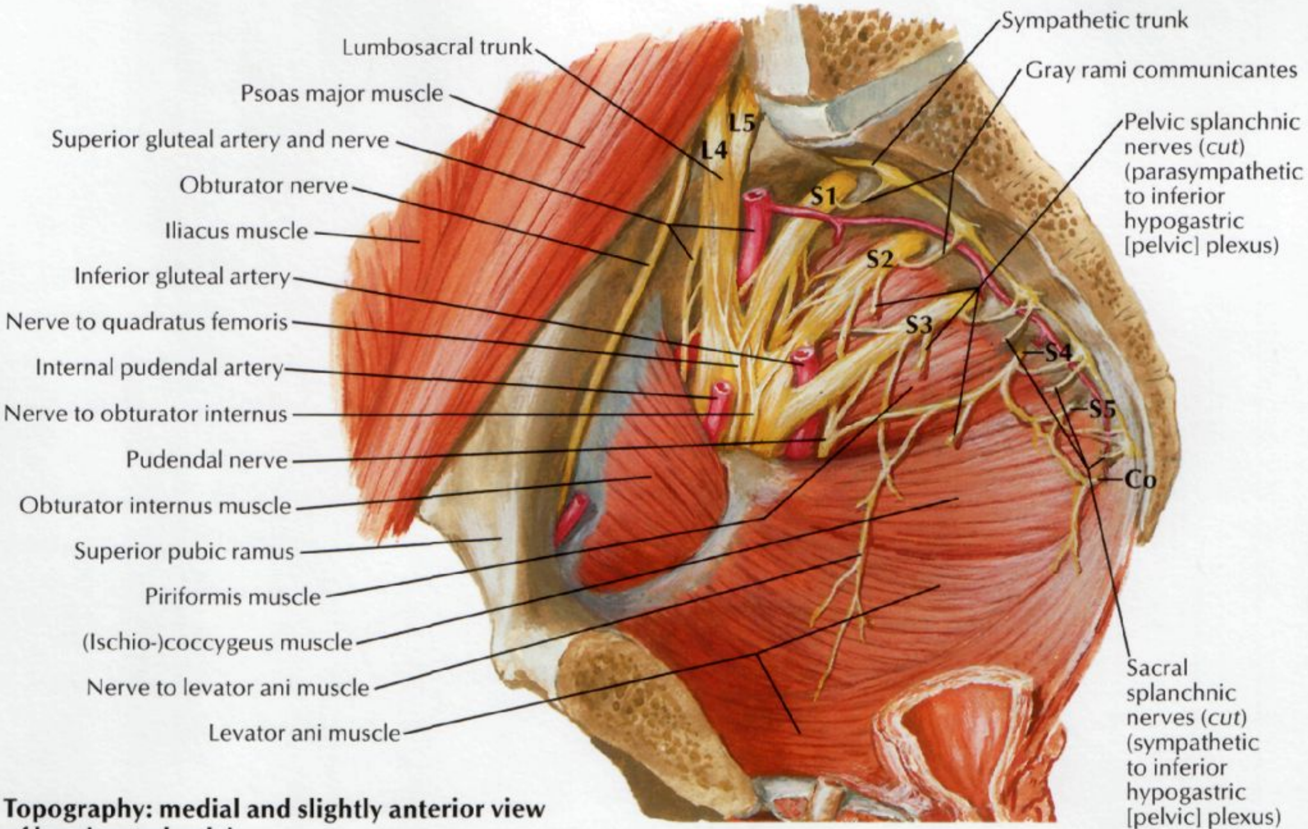
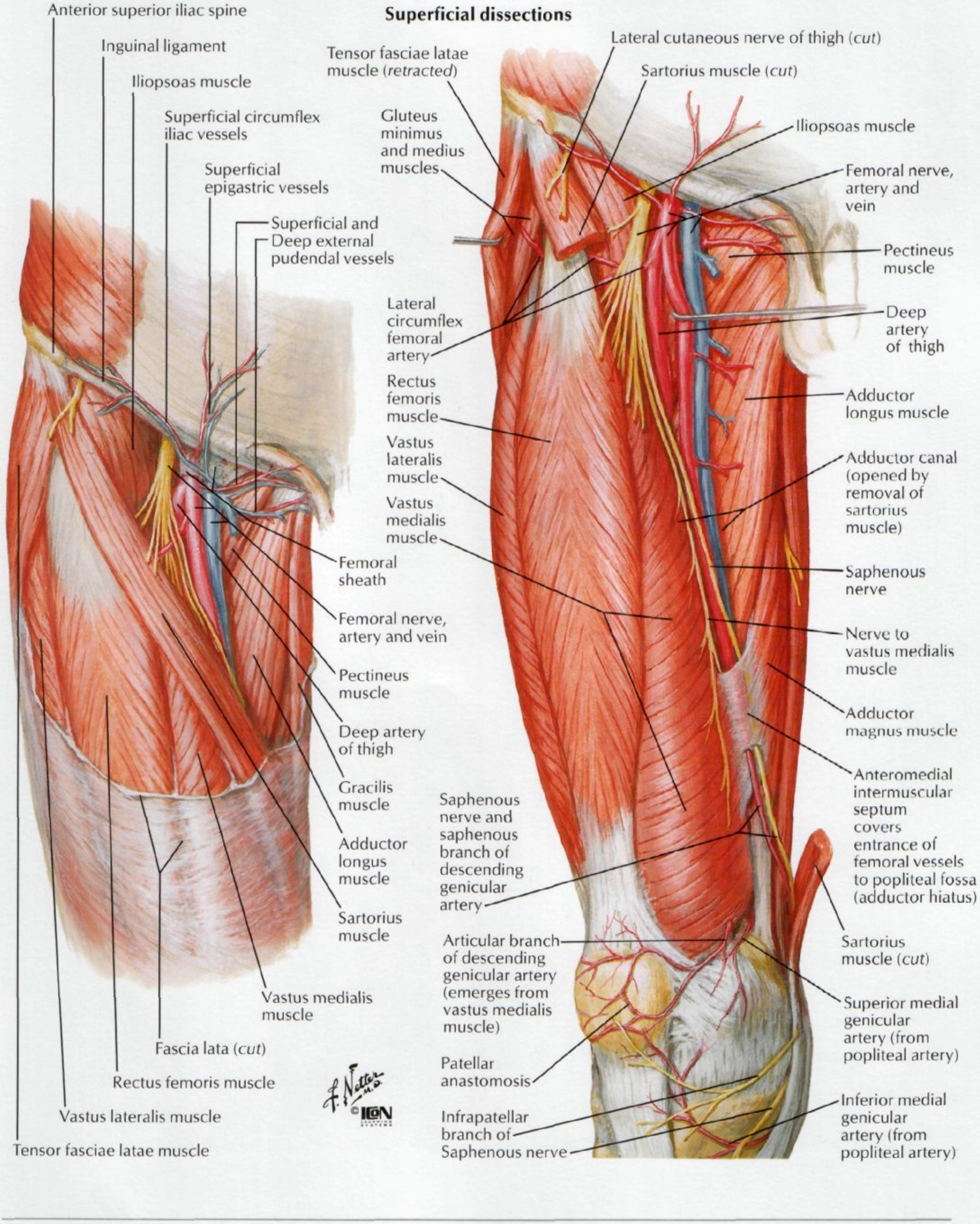


Lumbosacral trunk
Psoas major muscle
Superior gluteal artery and nerve
Obturator nerve
Iliacus muscle
Inferior gluteal artery
Nerve to quadratus femoris
Internal pudendal artery
Nerve to obturator internus
Pudendal nerve
Obturator internus muscle
Superior pubic ramus
Piriformis muscle
(Ischio-)coccygeus muscle
Nerve to levator ani muscle
Levator ani muscle
L5
L4
S1
S2
S3
S4
S5
Co
Sympathetic trunk
Gray rami communicantes
Pelvic splanchnic nerves (*cut*) (parasympathetic to inferior hypogastric [pelvic] plexus)
Sacral splanchnic nerves (*cut*) (sympathetic to inferior hypogastric [pelvic] plexus)

Topography: medial and slightly anterior view of hemisected pelvis

Arteries and Nerves of Thigh: Anterior Views

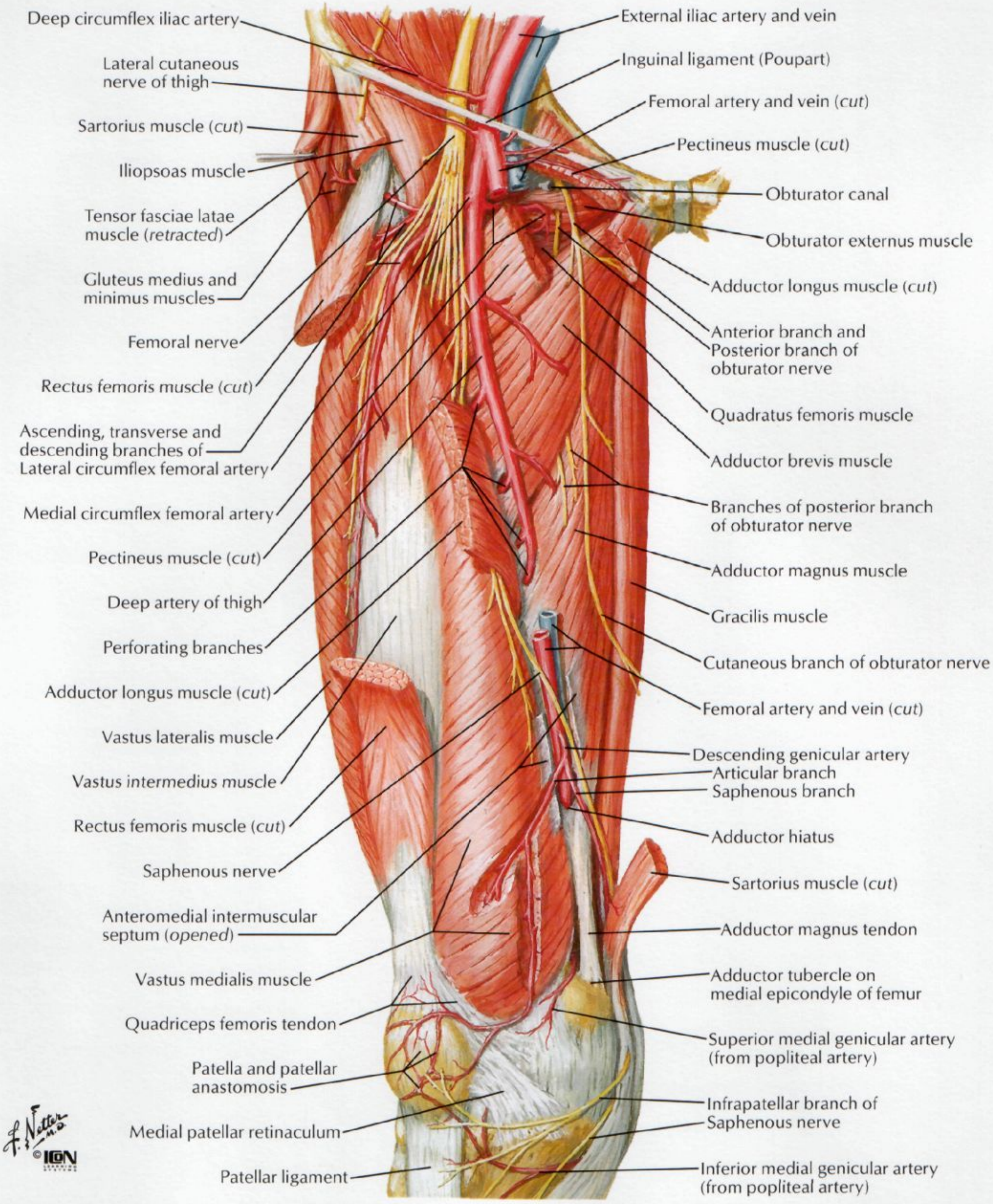
SEE ALSO PLATE 520


Superficial dissections
Anterior superior iliac spine
Inguinal ligament
Iliopsoas muscle
Superficial circumflex iliac vessels
Superficial epigastric vessels
Superficial and Deep external pudendal vessels
Femoral sheath
Femoral nerve, artery and vein
Pectineus muscle
Deep artery of thigh
Gracilis muscle
Adductor longus muscle
Sartorius muscle
Vastus medialis muscle
Fascia lata (*cut*)
Rectus femoris muscle
Vastus lateralis muscle
Tensor fasciae latae muscle
Tensor fasciae latae muscle (*retracted*)
Gluteus minimus and medius muscles
Lateral circumflex femoral artery
Rectus femoris muscle
Vastus lateralis muscle
Vastus medialis muscle
Saphenous nerve and saphenous branch of descending genicular artery
Articular branch of descending genicular artery (emerges from vastus medialis muscle)
Patellar anastomosis
Infrapatellar branch of Saphenous nerve
Lateral cutaneous nerve of thigh (*cut*)
Sartorius muscle (*cut*)
Iliopsoas muscle
Femoral nerve, artery and vein
Pectineus muscle
Deep artery of thigh
Adductor longus muscle
Adductor canal (opened by removal of sartorius muscle)
Saphenous nerve
Nerve to vastus medialis muscle
Adductor magnus muscle
Anteromedial intermuscular septum covers entrance of femoral vessels to popliteal fossa (adductor hiatus)
Sartorius muscle (*cut*)
Superior medial genicular artery (from popliteal artery)
Inferior medial genicular artery (from popliteal artery)

Arteries and Nerves of Thigh: Anterior Views (continued)

SEE ALSO PLATES 520, 521

Deep dissection


Deep circumflex iliac artery
Lateral cutaneous nerve of thigh
Sartorius muscle (*cut*)
Iliopsoas muscle
Tensor fasciae latae muscle (*retracted*)
Gluteus medius and minimus muscles
Femoral nerve
Rectus femoris muscle (*cut*)
Ascending, transverse and descending branches of Lateral circumflex femoral artery
Medial circumflex femoral artery
Pectineus muscle (*cut*)
Deep artery of thigh
Perforating branches
Adductor longus muscle (*cut*)
Vastus lateralis muscle
Vastus intermedius muscle
Rectus femoris muscle (*cut*)
Saphenous nerve
Anteromedial intermuscular septum (*opened*)
Vastus medialis muscle
Quadriceps femoris tendon
Patella and patellar anastomosis
Medial patellar retinaculum
Patellar ligament
External iliac artery and vein
Inguinal ligament (Poupart)
Femoral artery and vein (*cut*)
Pectineus muscle (*cut*)
Obturator canal
Obturator externus muscle
Adductor longus muscle (*cut*)
Anterior branch and Posterior branch of obturator nerve
Quadratus femoris muscle
Adductor brevis muscle
Branches of posterior branch of obturator nerve
Adductor magnus muscle
Gracilis muscle
Cutaneous branch of obturator nerve
Femoral artery and vein (*cut*)
Descending genicular artery
Articular branch
Saphenous branch
Adductor hiatus
Sartorius muscle (*cut*)
Adductor magnus tendon
Adductor tubercle on medial epicondyle of femur
Superior medial genicular artery (from popliteal artery)
Infrapatellar branch of Saphenous nerve
Inferior medial genicular artery (from popliteal artery)
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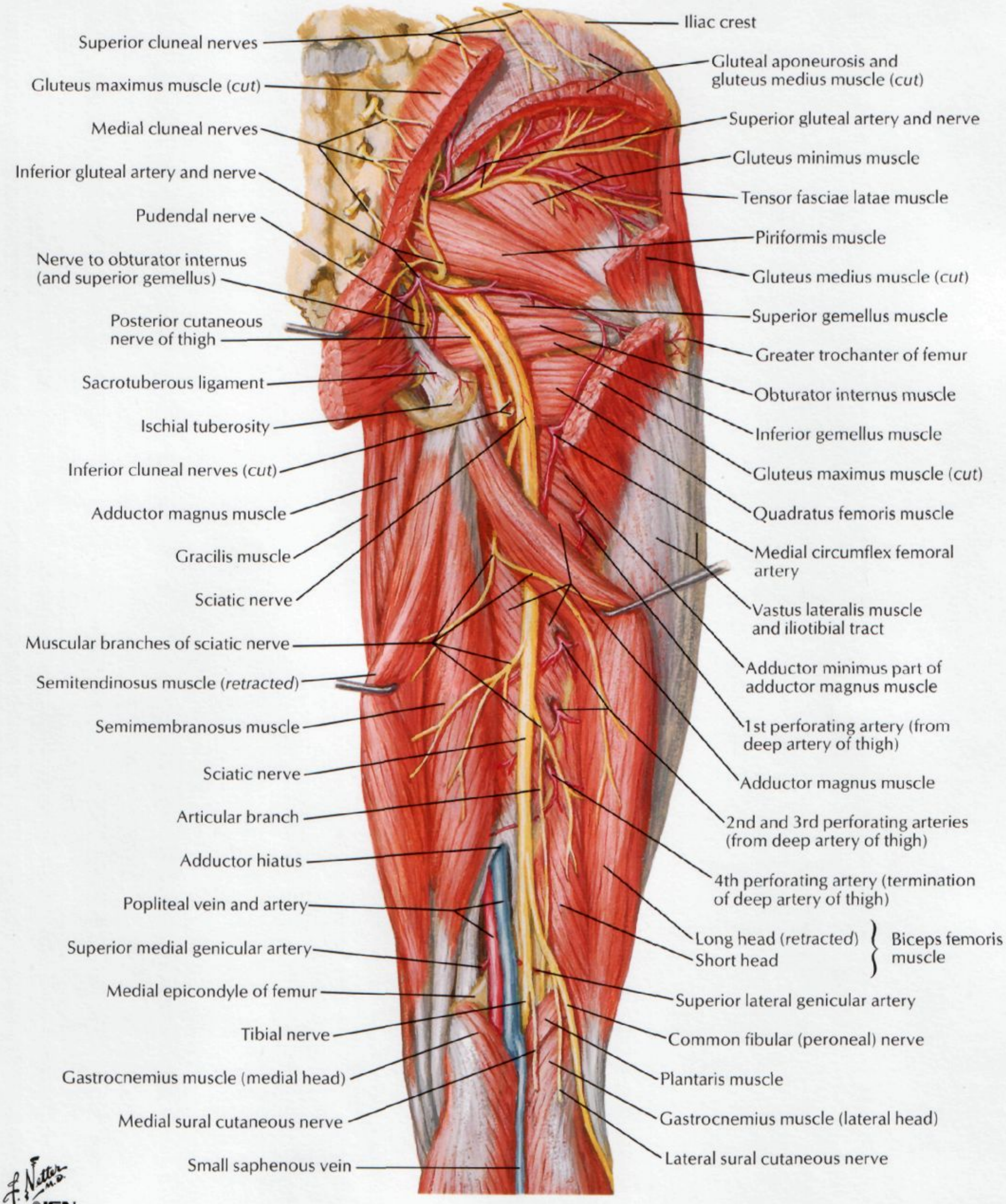
Arteries and Nerves of Thigh: Posterior View

SEE ALSO PLATE 522

Deep dissection


Superior cluneal nerves
Gluteus maximus muscle (*cut*)
Medial cluneal nerves
Inferior gluteal artery and nerve
Pudendal nerve
Nerve to obturator internus (and superior gemellus)
Posterior cutaneous nerve of thigh
Sacrotuberous ligament
Ischial tuberosity
Inferior cluneal nerves (*cut*)
Adductor magnus muscle
Gracilis muscle
Sciatic nerve
Muscular branches of sciatic nerve
Semitendinosus muscle (*retracted*)
Semimembranosus muscle
Sciatic nerve
Articular branch
Adductor hiatus
Popliteal vein and artery
Superior medial genicular artery
Medial epicondyle of femur
Tibial nerve
Gastrocnemius muscle (medial head)
Medial sural cutaneous nerve
Small saphenous vein
Iliac crest
Gluteal aponeurosis and gluteus medius muscle (*cut*)
Superior gluteal artery and nerve
Gluteus minimus muscle
Tensor fasciae latae muscle
Piriformis muscle
Gluteus medius muscle (*cut*)
Superior gemellus muscle
Greater trochanter of femur
Obturator internus muscle
Inferior gemellus muscle
Gluteus maximus muscle (*cut*)
Quadratus femoris muscle
Medial circumflex femoral artery
Vastus lateralis muscle and iliotibial tract
Adductor minimus part of adductor magnus muscle
1st perforating artery (from deep artery of thigh)
Adductor magnus muscle
2nd and 3rd perforating arteries (from deep artery of thigh)
4th perforating artery (termination of deep artery of thigh)
Long head (*retracted*)
Short head
Biceps femoris muscle
Superior lateral genicular artery
Common fibular (peroneal) nerve
Plantaris muscle
Gastrocnemius muscle (lateral head)
Lateral sural cutaneous nerve

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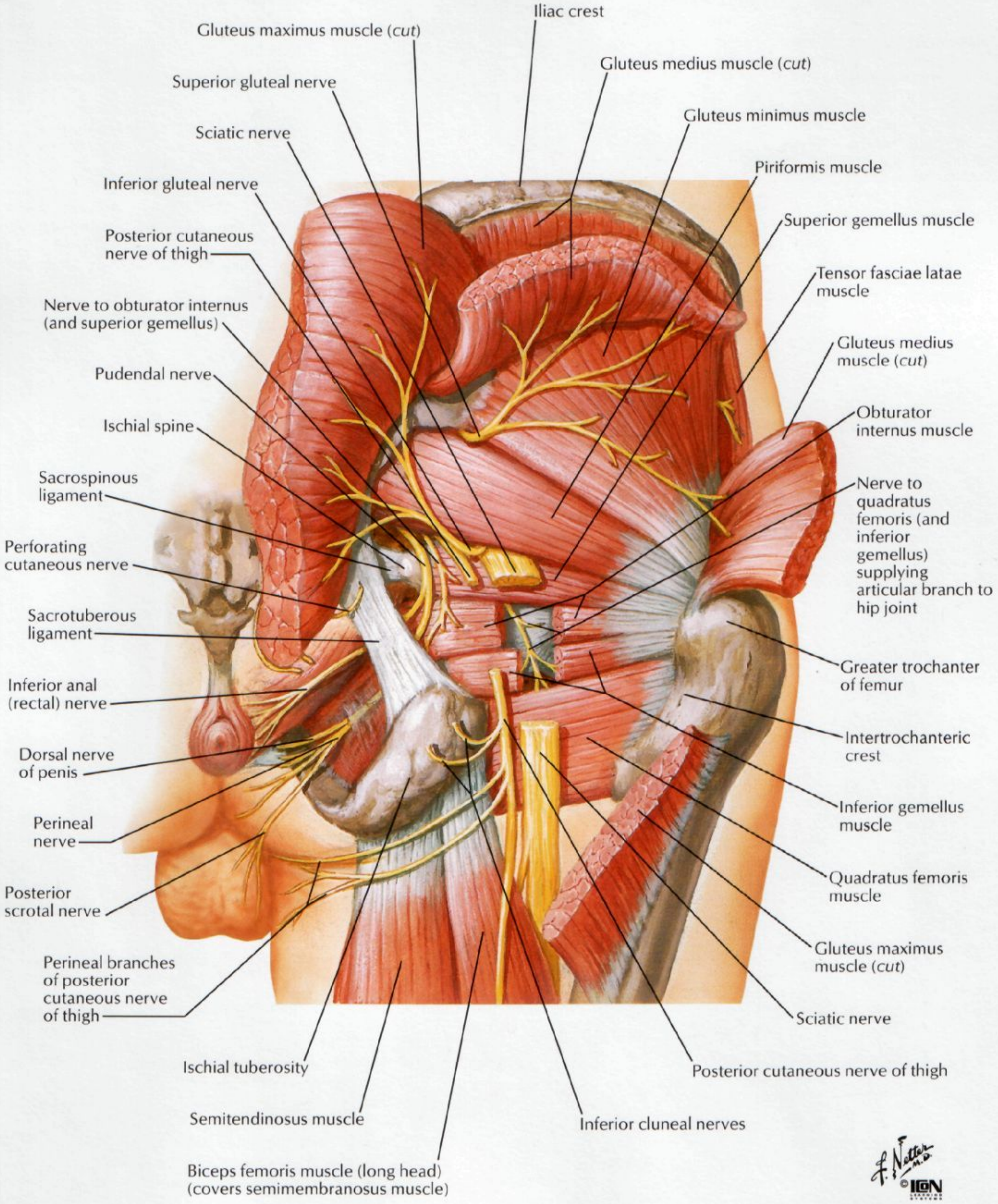
Nerves of Hip and Buttock


Iliac crest
Gluteus maximus muscle (*cut*)
Gluteus medius muscle (*cut*)
Superior gluteal nerve
Gluteus minimus muscle
Sciatic nerve
Piriformis muscle
Inferior gluteal nerve
Superior gemellus muscle
Posterior cutaneous nerve of thigh
Tensor fasciae latae muscle
Nerve to obturator internus (and superior gemellus)
Gluteus medius muscle (*cut*)
Pudendal nerve
Obturator internus muscle
Ischial spine
Sacrospinous ligament
Nerve to quadratus femoris (and inferior gemellus) supplying articular branch to hip joint
Perforating cutaneous nerve
Sacrotuberous ligament
Greater trochanter of femur
Inferior anal (rectal) nerve
Intertrochanteric crest
Dorsal nerve of penis
Inferior gemellus muscle
Perineal nerve
Quadratus femoris muscle
Posterior scrotal nerve
Gluteus maximus muscle (*cut*)
Perineal branches of posterior cutaneous nerve of thigh
Sciatic nerve
Ischial tuberosity
Posterior cutaneous nerve of thigh
Semitendinosus muscle
Inferior cluneal nerves
Biceps femoris muscle (long head) (covers semimembranosus muscle)
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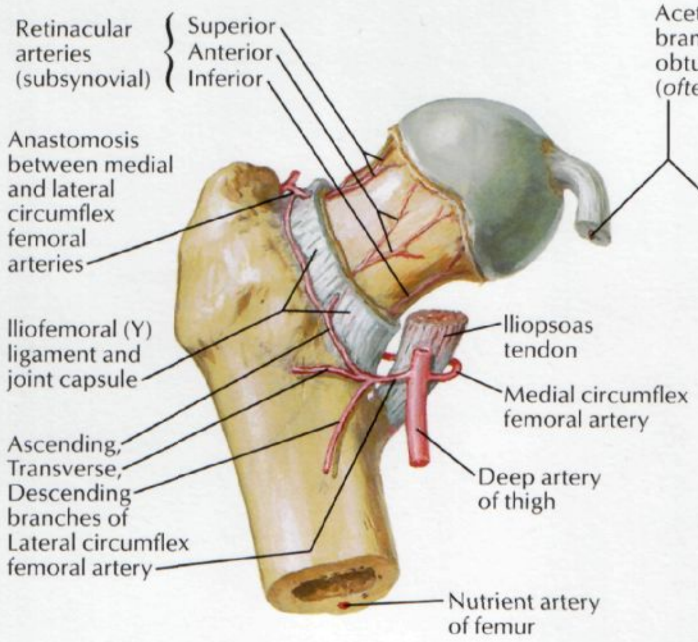
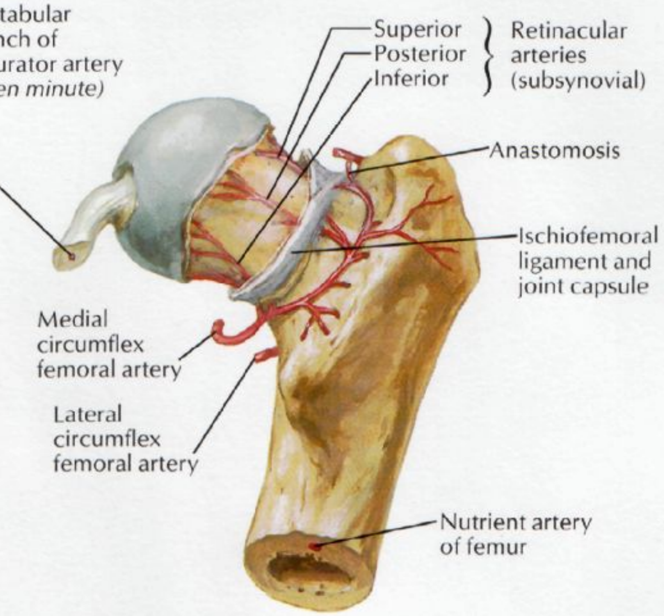
Arteries of Femoral Head and Neck

SEE ALSO PLATE 494

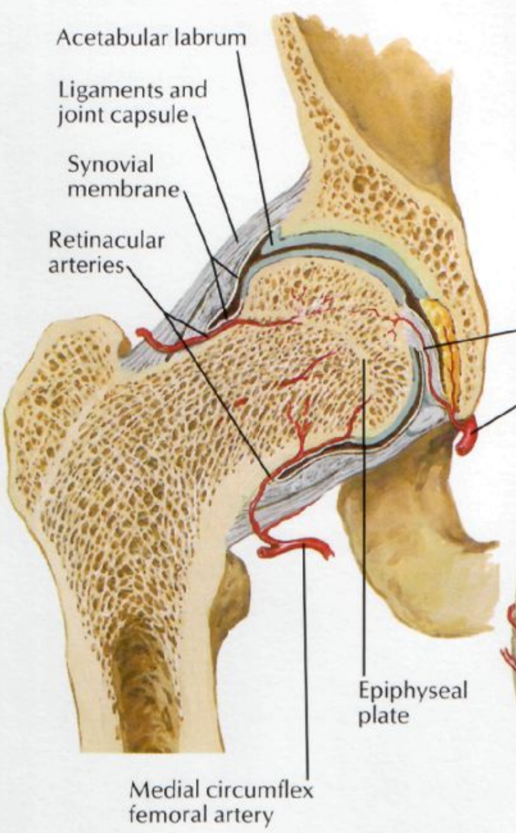
Anterior view


Retinacular arteries (subsynovial)
Superior
Anterior
Inferior
Acetabular branch of obturator artery (*often minute*)
Anastomosis between medial and lateral circumflex femoral arteries
Iliofemoral (Y) ligament and joint capsule
Ascending,
Transverse,
Descending
branches of Lateral circumflex femoral artery
Iliopsoas tendon
Medial circumflex femoral artery
Deep artery of thigh
Nutrient artery of femur

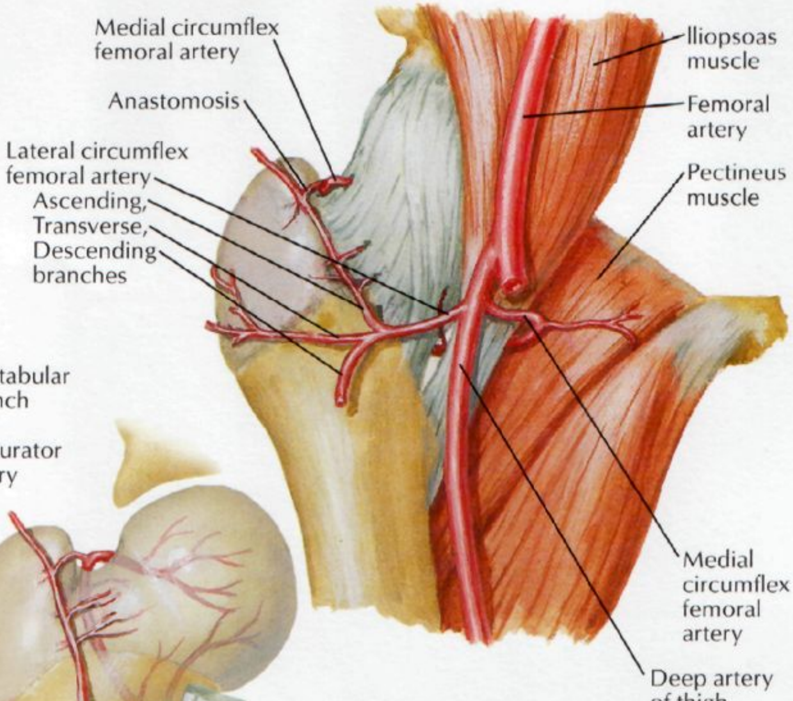
Posterior view

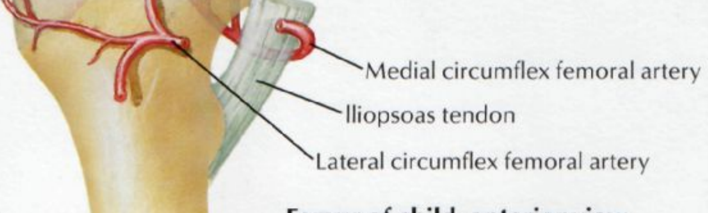

Superior
Posterior
Inferior
Retinacular arteries (subsynovial)
Anastomosis
Ischiofemoral ligament and joint capsule
Medial circumflex femoral artery
Lateral circumflex femoral artery
Nutrient artery of femur

Coronal section



Anterior view in situ




Medial circumflex femoral artery
Iliopsoas tendon
Lateral circumflex femoral artery

Femur of child: anterior view

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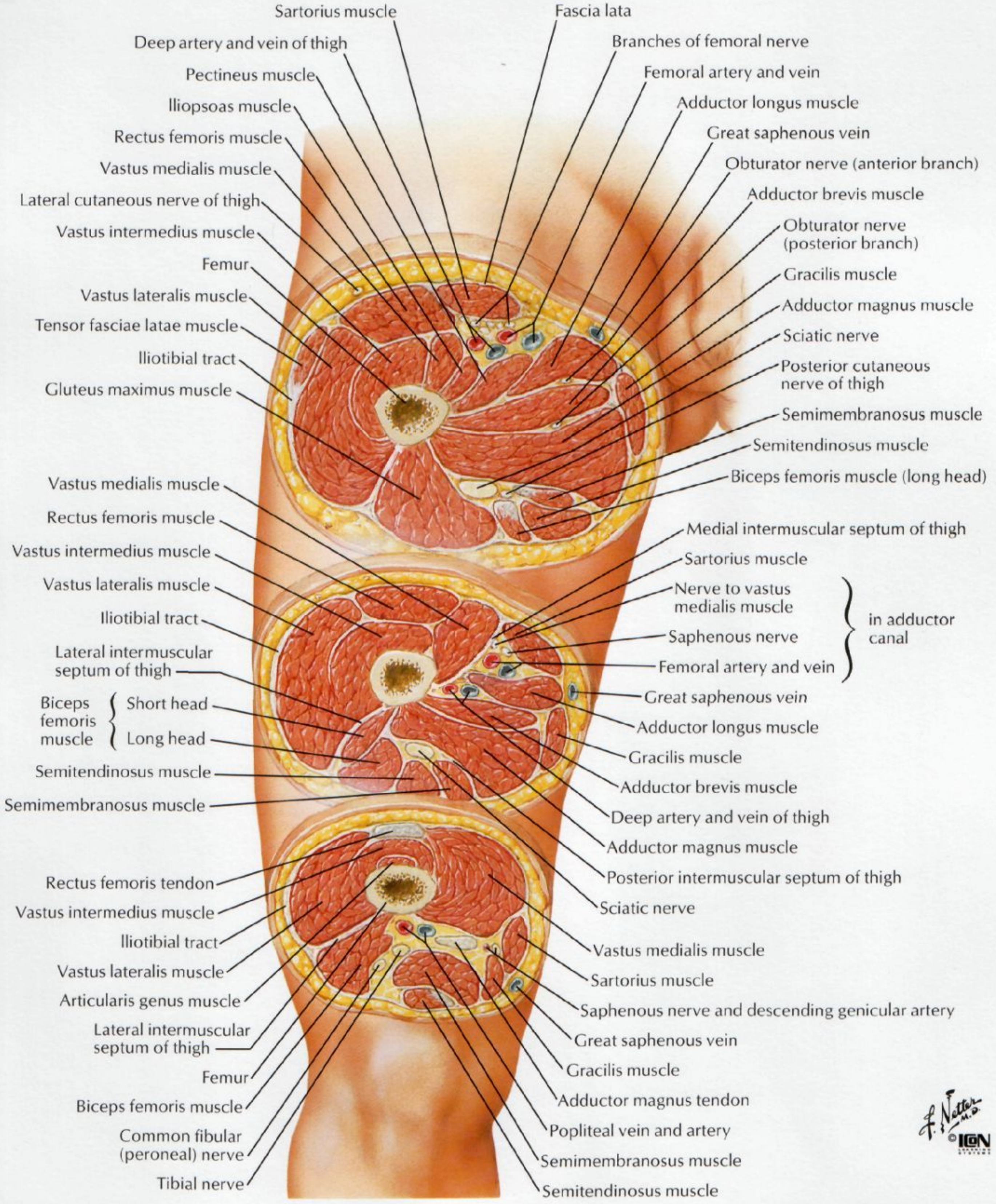
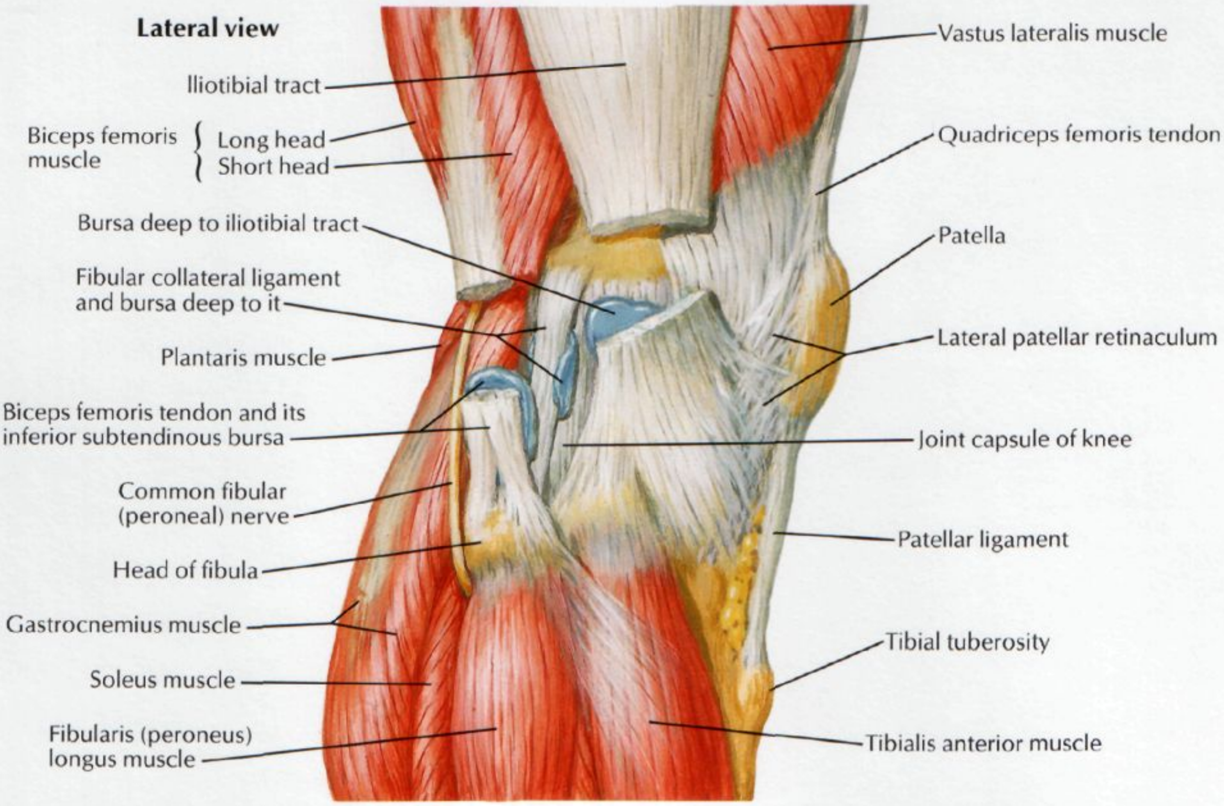
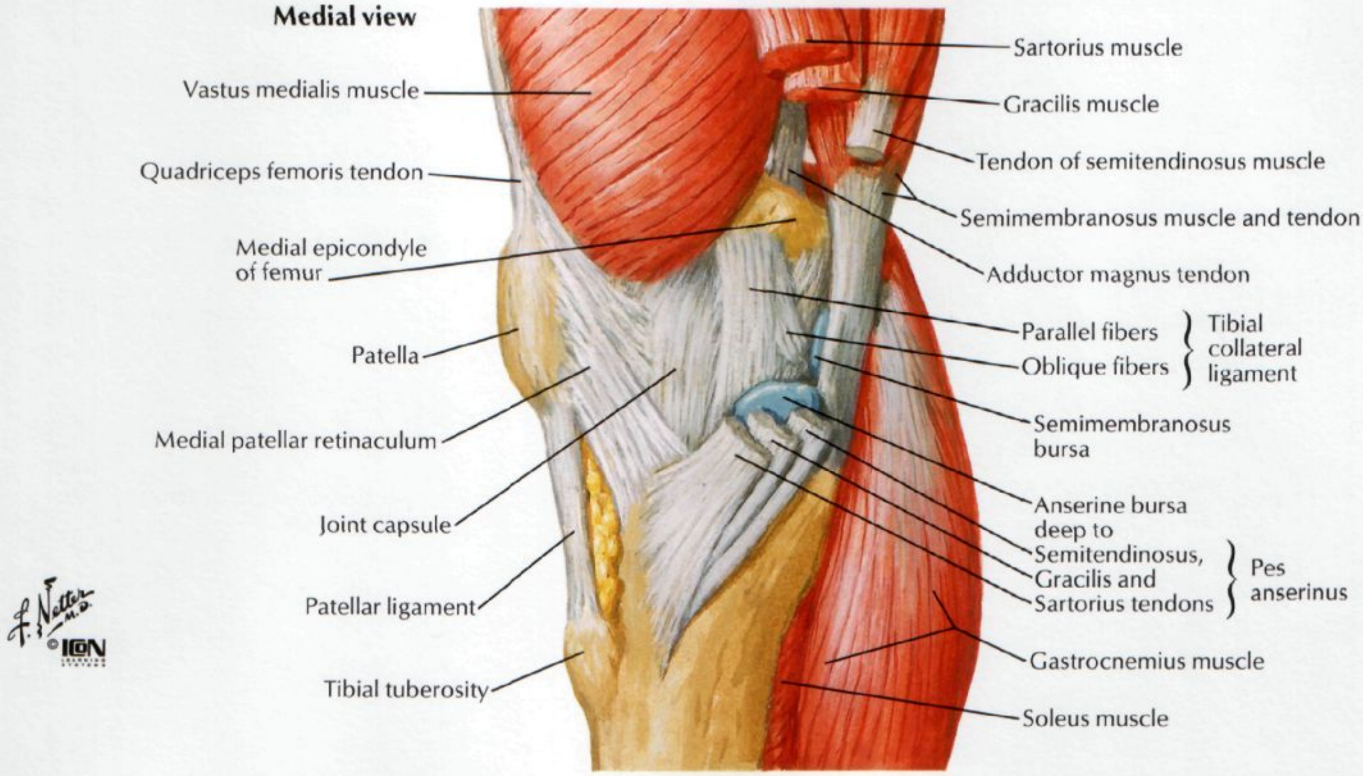
Thigh: Serial Cross Sections



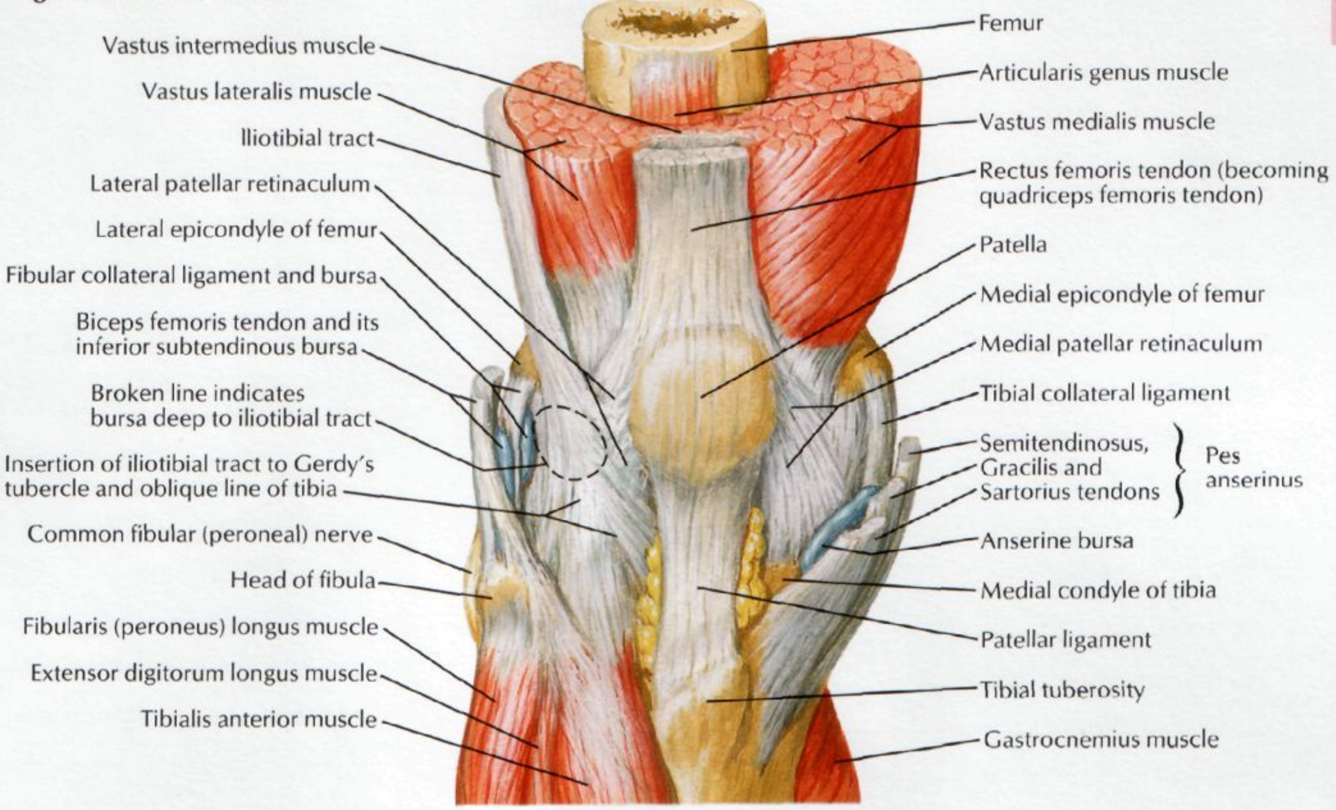
Knee: Lateral and Medial Views


Lateral view
Iliotibial tract
Biceps femoris muscle
Long head
Short head
Bursa deep to iliotibial tract
Fibular collateral ligament and bursa deep to it
Plantaris muscle
Biceps femoris tendon and its inferior subtendinous bursa
Common fibular (peroneal) nerve
Head of fibula
Gastrocnemius muscle
Soleus muscle
Fibularis (peroneus) longus muscle
Vastus lateralis muscle
Quadriceps femoris tendon
Patella
Lateral patellar retinaculum
Joint capsule of knee
Patellar ligament
Tibial tuberosity
Tibialis anterior muscle

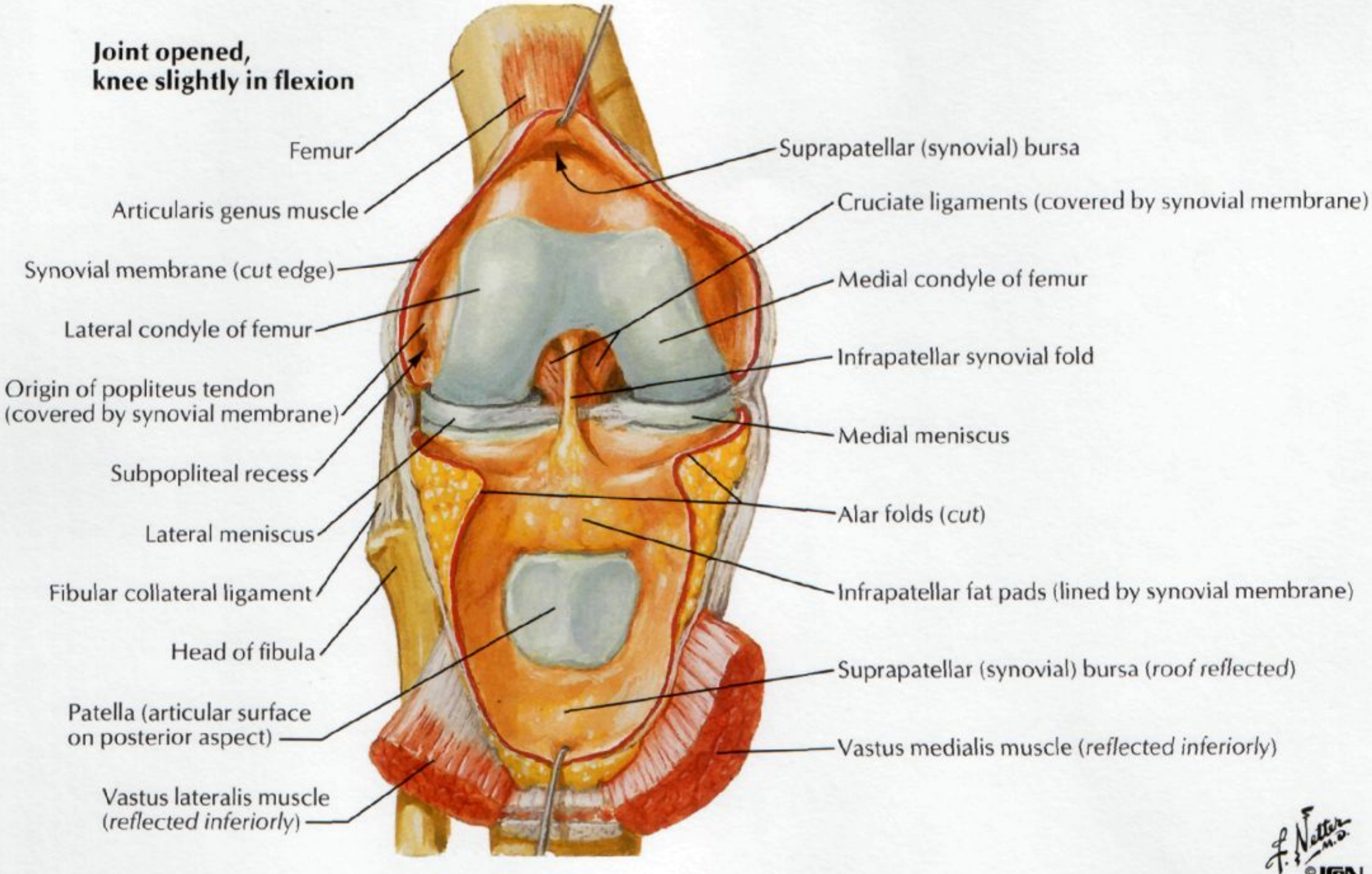

Medial view

Knee: Anterior Views

Right knee in extension

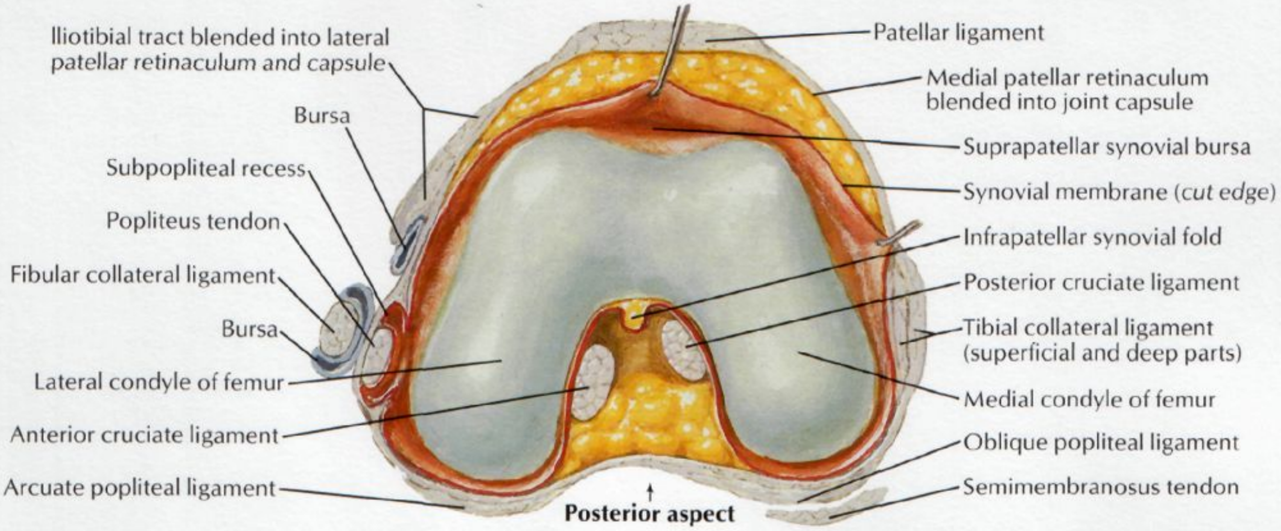

Vastus intermedius muscle
Vastus lateralis muscle
Iliotibial tract
Lateral patellar retinaculum
Lateral epicondyle of femur
Fibular collateral ligament and bursa
Biceps femoris tendon and its inferior subtendinous bursa
Broken line indicates bursa deep to iliotibial tract
Insertion of iliotibial tract to Gerdy's tubercle and oblique line of tibia
Common fibular (peroneal) nerve
Head of fibula
Fibularis (peroneus) longus muscle
Extensor digitorum longus muscle
Tibialis anterior muscle
Femur
Articularis genus muscle
Vastus medialis muscle
Rectus femoris tendon (becoming quadriceps femoris tendon)
Patella
Medial epicondyle of femur
Medial patellar retinaculum
Tibial collateral ligament
Semitendinosus,
Gracilis and
Sartorius tendons
Pes anserinus
Anserine bursa
Medial condyle of tibia
Patellar ligament
Tibial tuberosity
Gastrocnemius muscle

Joint opened, knee slightly in flexion

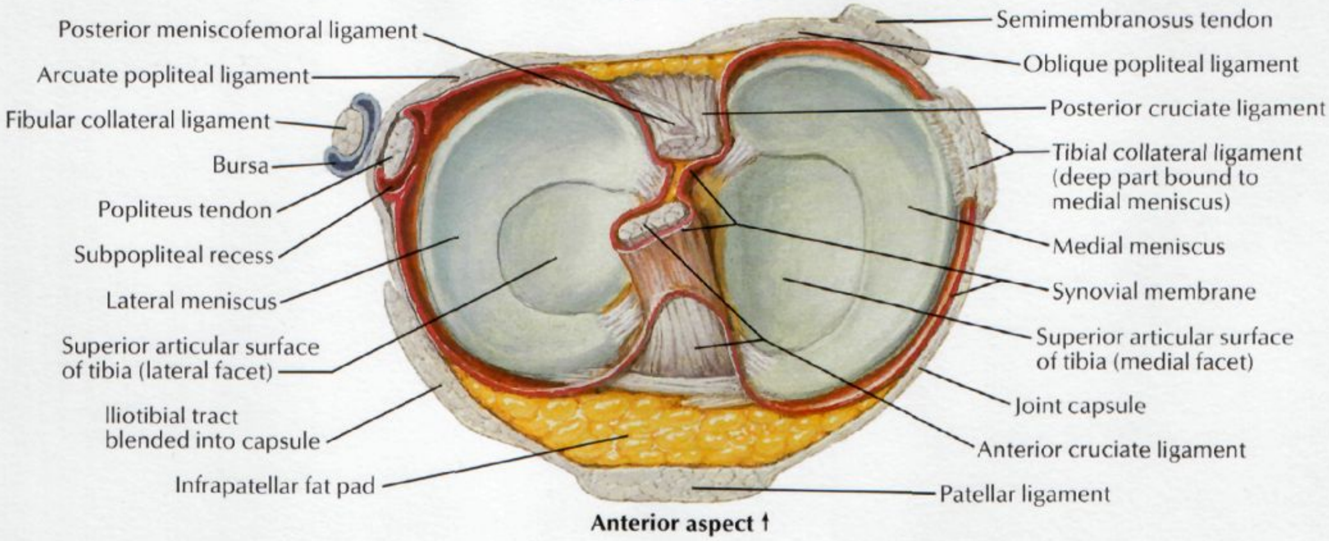

Femur
Articularis genus muscle
Synovial membrane (*cut edge*)
Lateral condyle of femur
Origin of popliteus tendon (covered by synovial membrane)
Subpopliteal recess
Lateral meniscus
Fibular collateral ligament
Head of fibula
Patella (articular surface on posterior aspect)
Vastus lateralis muscle (*reflected inferiorly*)
Suprapatellar (synovial) bursa
Cruciate ligaments (covered by synovial membrane)
Medial condyle of femur
Infrapatellar synovial fold
Medial meniscus
Alar folds (*cut*)
Infrapatellar fat pads (lined by synovial membrane)
Suprapatellar (synovial) bursa (*roof reflected*)
Vastus medialis muscle (*reflected inferiorly*)

Knee: Interior

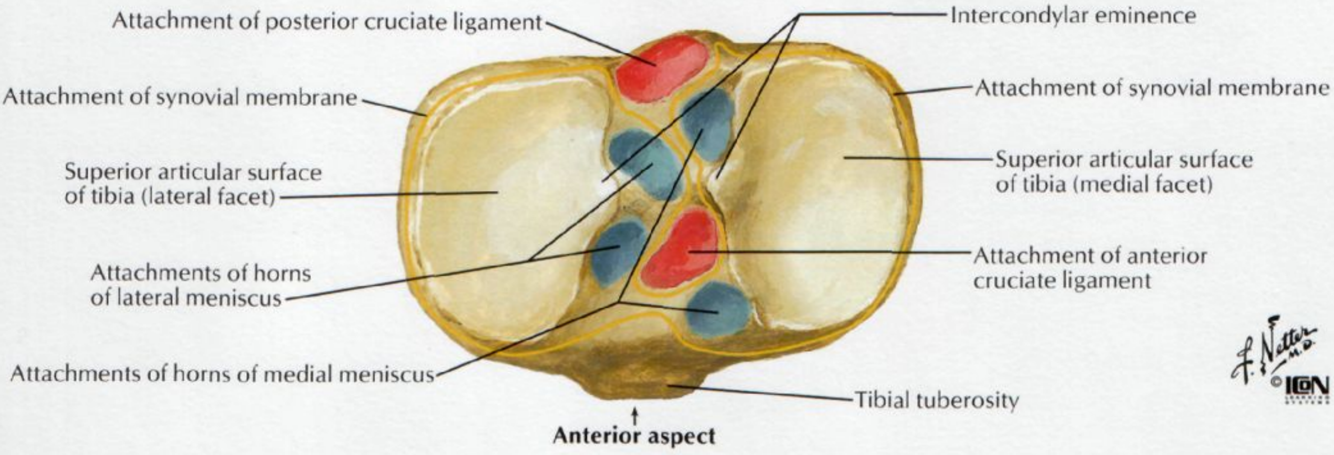
Inferior view


Iliotibial tract blended into lateral patellar retinaculum and capsule
Bursa
Subpopliteal recess
Popliteus tendon
Fibular collateral ligament
Bursa
Lateral condyle of femur
Anterior cruciate ligament
Arcuate popliteal ligament
Posterior aspect
Patellar ligament
Medial patellar retinaculum blended into joint capsule
Suprapatellar synovial bursa
Synovial membrane (*cut edge*)
Infrapatellar synovial fold
Posterior cruciate ligament
Tibial collateral ligament (superficial and deep parts)
Medial condyle of femur
Oblique popliteal ligament
Semimembranosus tendon

Superior view


Posterior meniscofemoral ligament
Arcuate popliteal ligament
Fibular collateral ligament
Bursa
Popliteus tendon
Subpopliteal recess
Lateral meniscus
Superior articular surface of tibia (lateral facet)
Iliotibial tract blended into capsule
Infrapatellar fat pad
Anterior aspect
Semimembranosus tendon
Oblique popliteal ligament
Posterior cruciate ligament
Tibial collateral ligament (deep part bound to medial meniscus)
Medial meniscus
Synovial membrane
Superior articular surface of tibia (medial facet)
Joint capsule
Anterior cruciate ligament
Patellar ligament

Superior view: ligaments and cartilage removed


Attachment of posterior cruciate ligament
Attachment of synovial membrane
Superior articular surface of tibia (lateral facet)
Attachments of horns of lateral meniscus
Attachments of horns of medial meniscus
Anterior aspect
Intercondylar eminence
Attachment of synovial membrane
Superior articular surface of tibia (medial facet)
Attachment of anterior cruciate ligament
Tibial tuberosity
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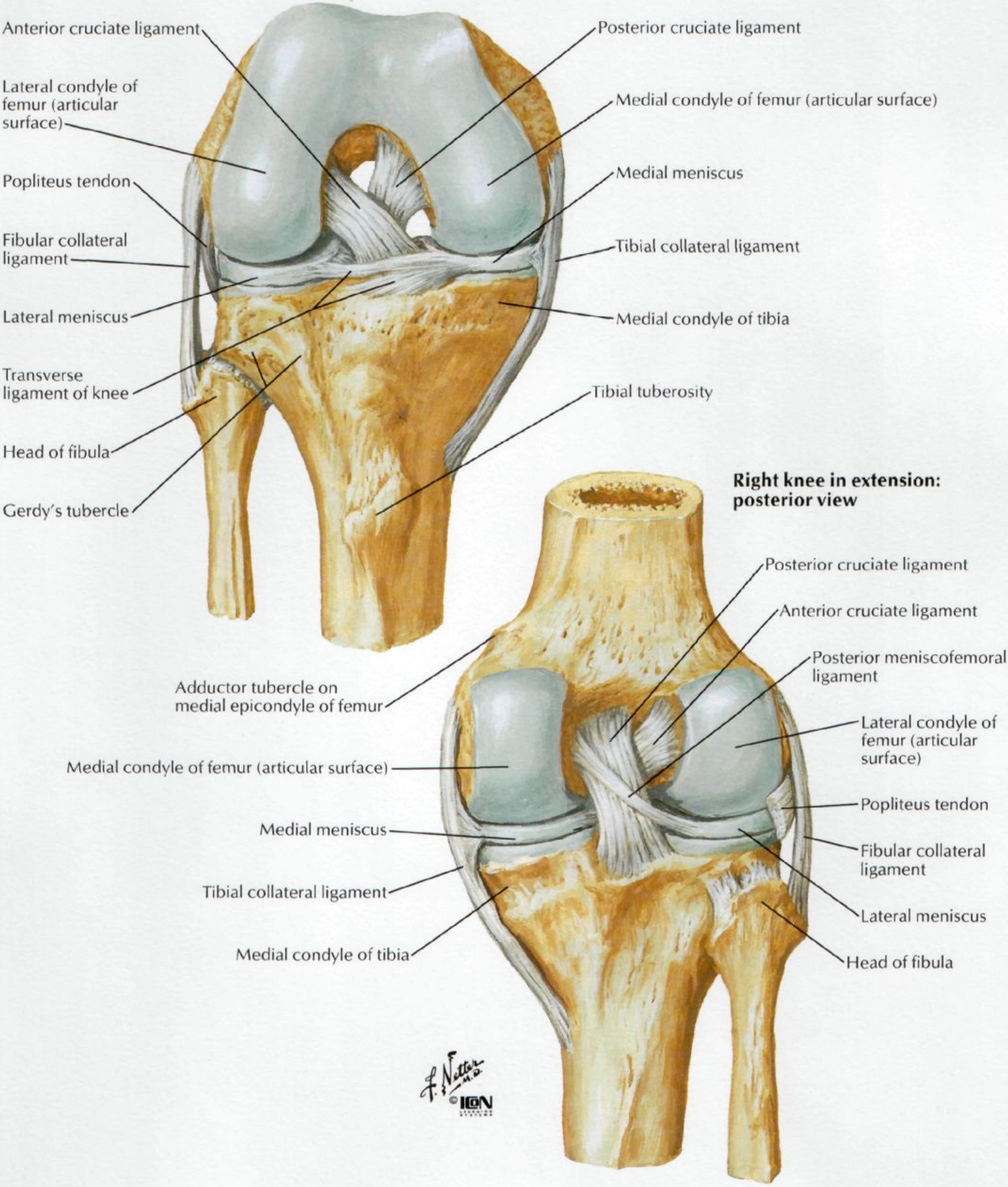
Knee: Cruciate and Collateral Ligaments



Right knee in flexion: anterior view

Anterior cruciate ligament
Lateral condyle of femur (articular surface)
Popliteus tendon
Fibular collateral ligament
Lateral meniscus
Transverse ligament of knee
Head of fibula
Gerdy's tubercle
Posterior cruciate ligament
Medial condyle of femur (articular surface)
Medial meniscus
Tibial collateral ligament
Medial condyle of tibia
Tibial tuberosity

Right knee in extension: posterior view

Adductor tubercle on medial epicondyle of femur
Medial condyle of femur (articular surface)
Medial meniscus
Tibial collateral ligament
Medial condyle of tibia
Posterior cruciate ligament
Anterior cruciate ligament
Posterior meniscofemoral ligament
Lateral condyle of femur (articular surface)
Popliteus tendon
Fibular collateral ligament
Lateral meniscus
Head of fibula
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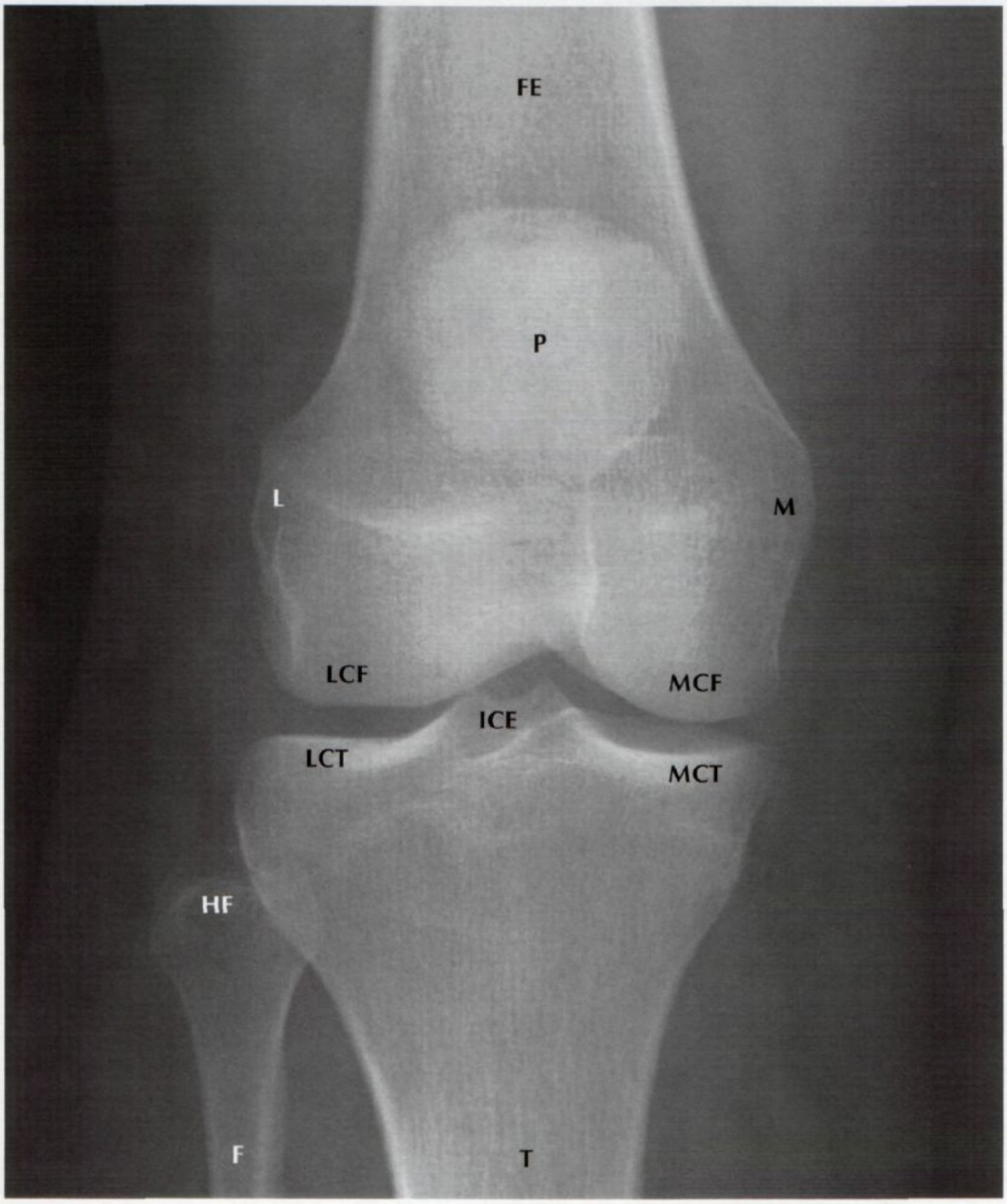
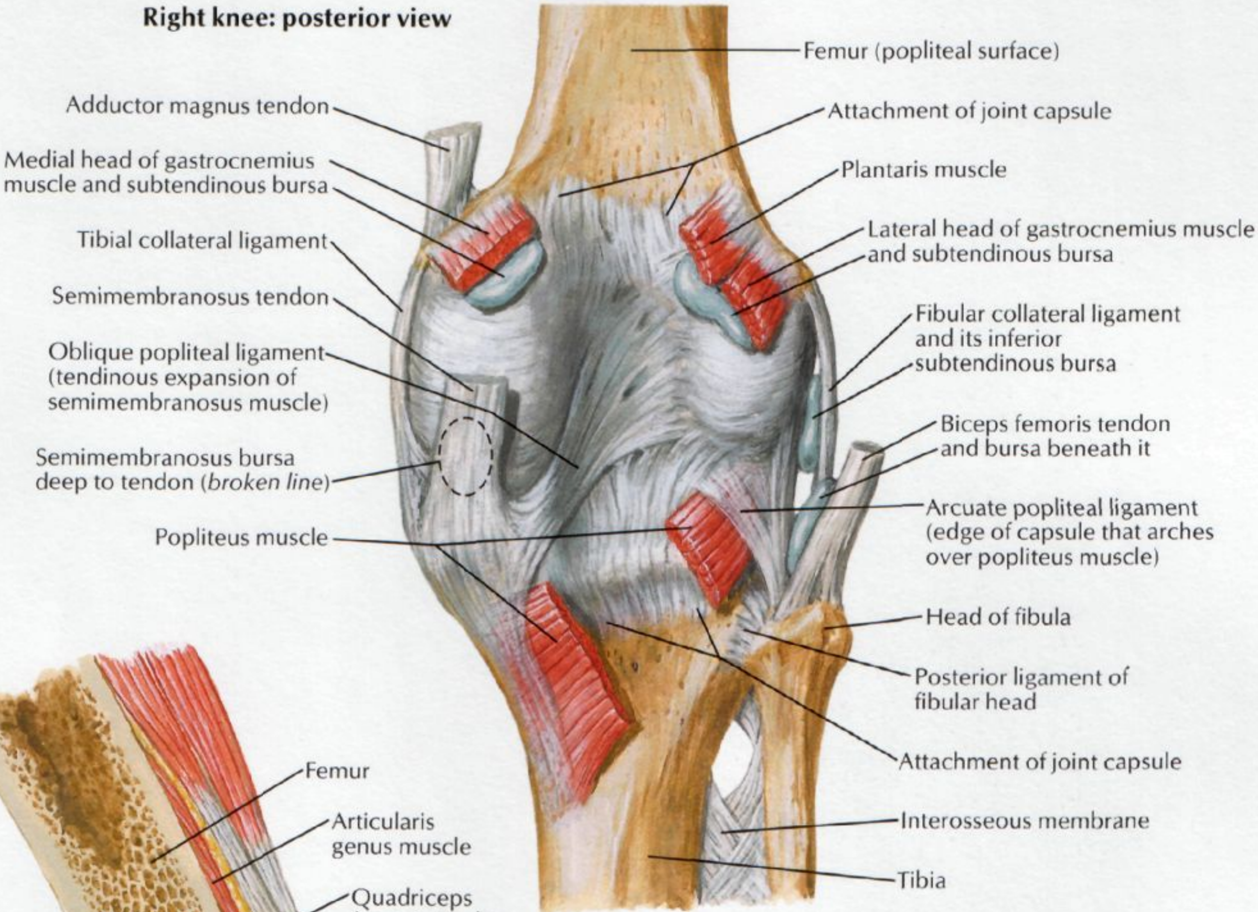
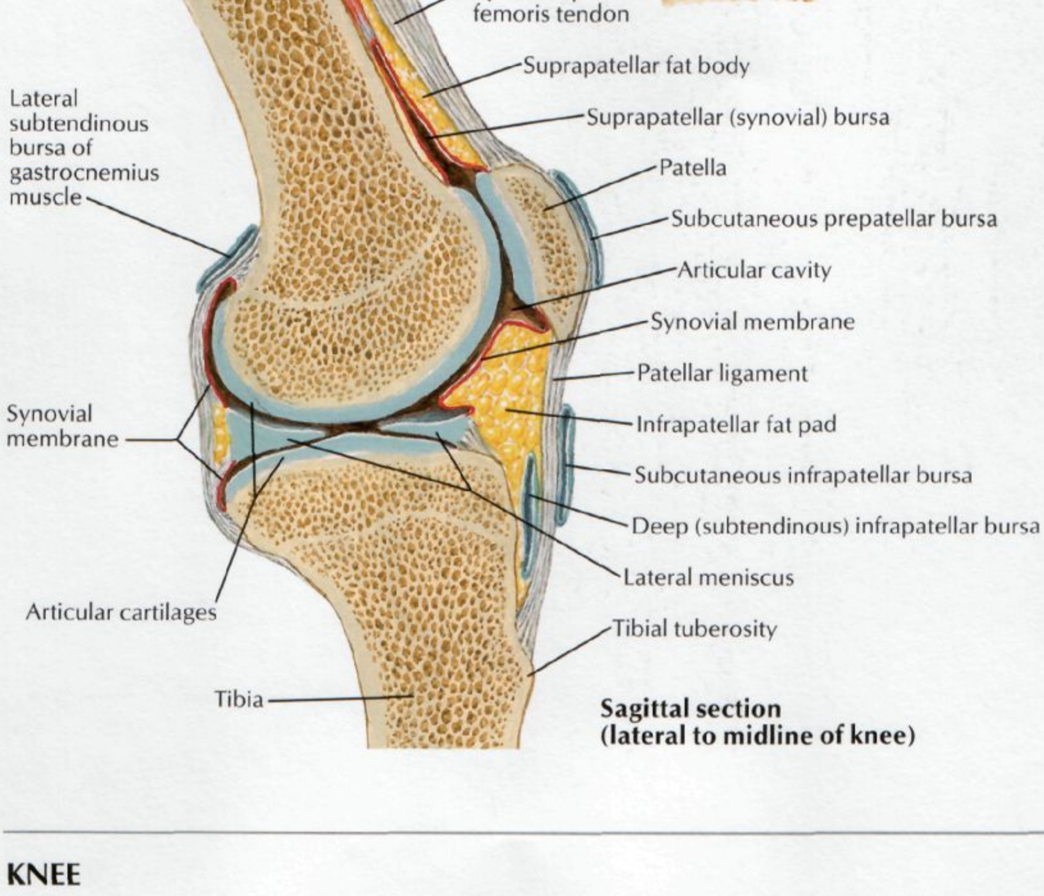
Knee: Anteroposterior Radiograph



F	Fibula
FE	Femur
HF	Head of fibula
ICE	Intercondylar eminence
L	Lateral epicondyle
LCF	Lateral condyle of femur
LCT	Lateral condyle of tibia
M	Medial epicondyle
MCF	Medial condyle of femur
MCT	Medial condyle of tibia
P	Patella
T	Tibia

Right knee: posterior view


Femur (popliteal surface)
Adductor magnus tendon
Attachment of joint capsule
Medial head of gastrocnemius muscle and subtendinous bursa
Plantaris muscle
Tibial collateral ligament
Lateral head of gastrocnemius muscle and subtendinous bursa
Semimembranosus tendon
Fibular collateral ligament and its inferior subtendinous bursa
Oblique popliteal ligament (tendinous expansion of semimembranosus muscle)
Biceps femoris tendon and bursa beneath it
Semimembranosus bursa deep to tendon (*broken line*)
Arcuate popliteal ligament (edge of capsule that arches over popliteus muscle)
Popliteus muscle
Head of fibula
Posterior ligament of fibular head
Attachment of joint capsule
Interosseous membrane
Tibia


Femur
Articularis genus muscle
Quadriceps femoris tendon
Suprapatellar fat body
Suprapatellar (synovial) bursa
Lateral subtendinous bursa of gastrocnemius muscle
Patella
Subcutaneous prepatellar bursa
Articular cavity
Synovial membrane
Patellar ligament
Synovial membrane
Infrapatellar fat pad
Subcutaneous infrapatellar bursa
Deep (subtendinous) infrapatellar bursa
Lateral meniscus
Articular cartilages
Tibial tuberosity
Tibia

Sagittal section (lateral to midline of knee)

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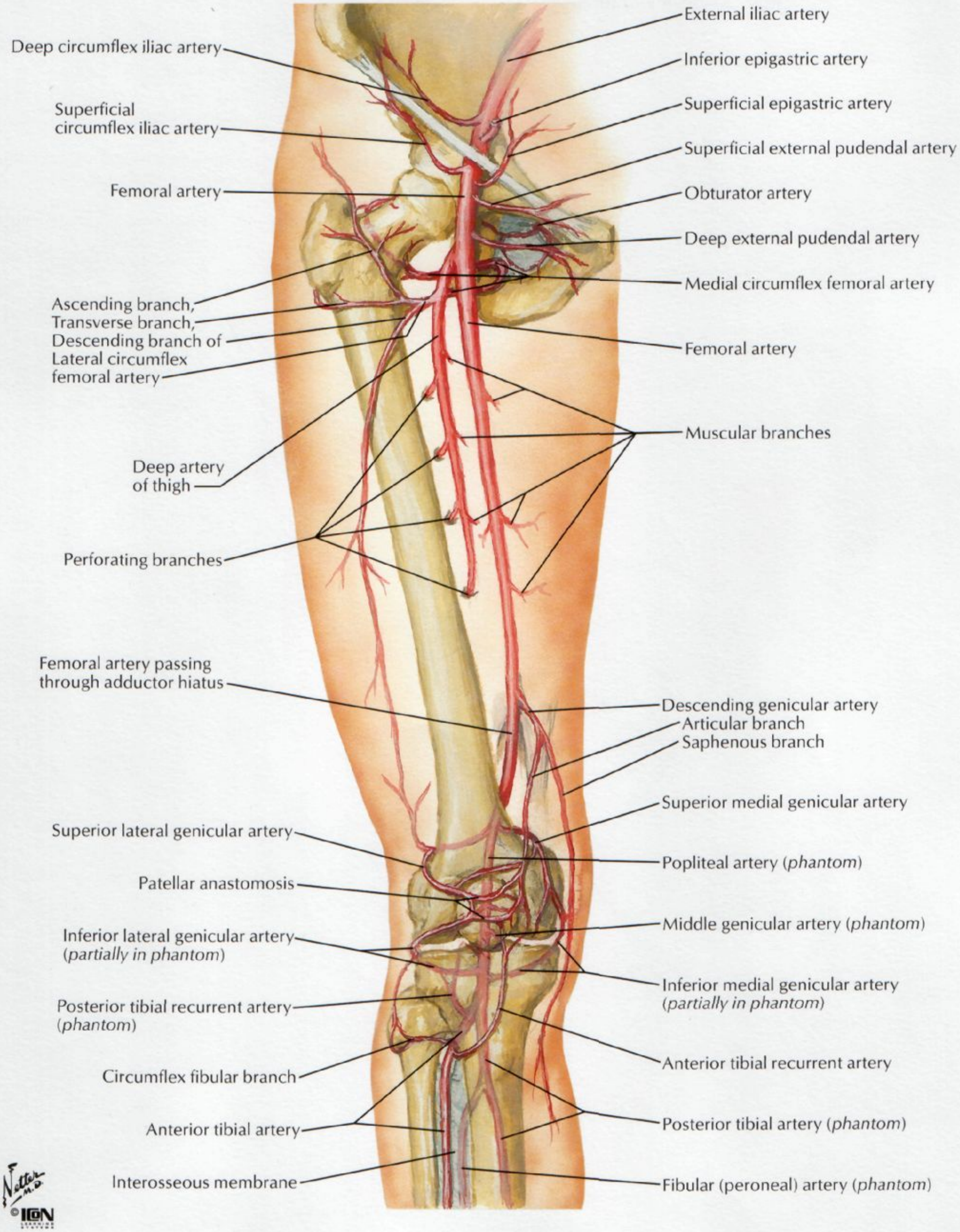
Arteries of Thigh and Knee: Schema



Deep circumflex iliac artery
Superficial circumflex iliac artery
Femoral artery
Ascending branch,
Transverse branch,
Descending branch of
Lateral circumflex femoral artery
Deep artery of thigh
Perforating branches
Femoral artery passing through adductor hiatus
Superior lateral genicular artery
Patellar anastomosis
Inferior lateral genicular artery (*partially in phantom*)
Posterior tibial recurrent artery (*phantom*)
Circumflex fibular branch
Anterior tibial artery
Interosseous membrane
External iliac artery
Inferior epigastric artery
Superficial epigastric artery
Superficial external pudendal artery
Obturator artery
Deep external pudendal artery
Medial circumflex femoral artery
Femoral artery
Muscular branches
Descending genicular artery
Articular branch
Saphenous branch
Superior medial genicular artery
Popliteal artery (*phantom*)
Middle genicular artery (*phantom*)
Inferior medial genicular artery (*partially in phantom*)
Anterior tibial recurrent artery
Posterior tibial artery (*phantom*)
Fibular (peroneal) artery (*phantom*)

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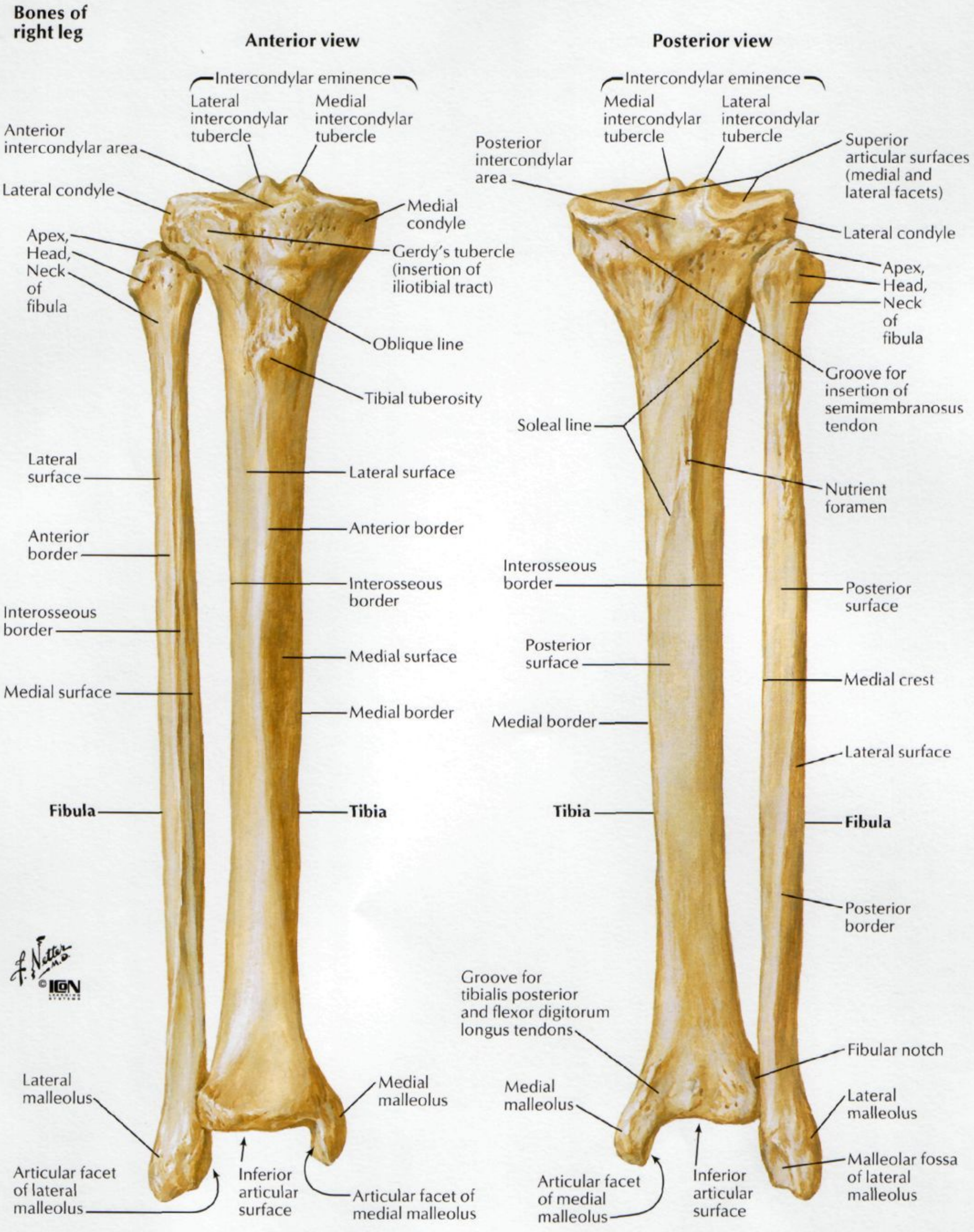
Tibia and Fibula



Bones of right leg

Anterior view
Intercondylar eminence
Lateral intercondylar tubercle
Medial intercondylar tubercle
Anterior intercondylar area
Lateral condyle
Medial condyle
Apex, Head, Neck of fibula
Gerdy's tubercle (insertion of iliotibial tract)
Oblique line
Tibial tuberosity
Lateral surface
Anterior border
Interosseous border
Medial surface
Medial border
Lateral surface
Anterior border
Interosseous border
Medial surface
Fibula
Tibia
Lateral malleolus
Medial malleolus
Articular facet of lateral malleolus
Inferior articular surface
Articular facet of medial malleolus
Posterior view
Intercondylar eminence
Medial intercondylar tubercle
Lateral intercondylar tubercle
Posterior intercondylar area
Superior articular surfaces (medial and lateral facets)
Lateral condyle
Apex, Head, Neck of fibula
Groove for insertion of semimembranosus tendon
Soleal line
Nutrient foramen
Interosseous border
Posterior surface
Posterior surface
Medial crest
Medial border
Lateral surface
Tibia
Fibula
Posterior border
Groove for tibialis posterior and flexor digitorum longus tendons
Fibular notch
Medial malleolus
Lateral malleolus
Malleolar fossa of lateral malleolus
Articular facet of medial malleolus
Inferior articular surface
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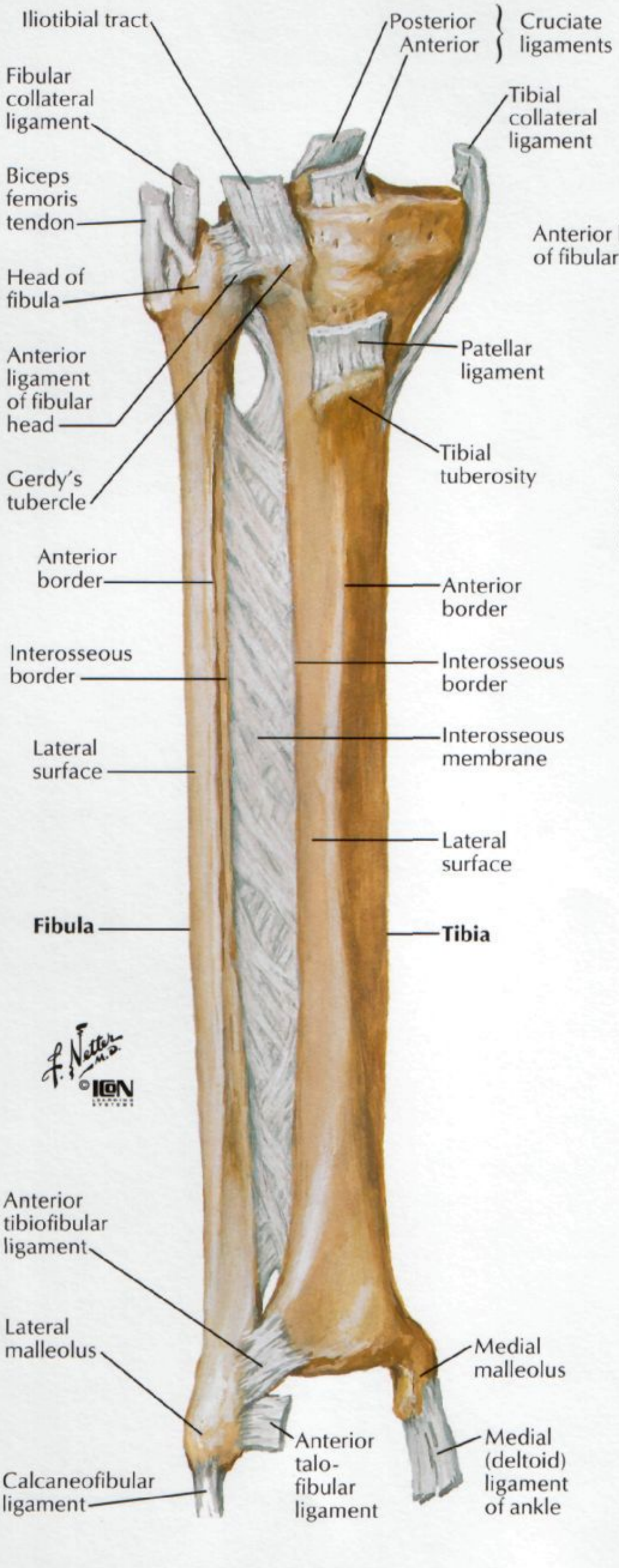
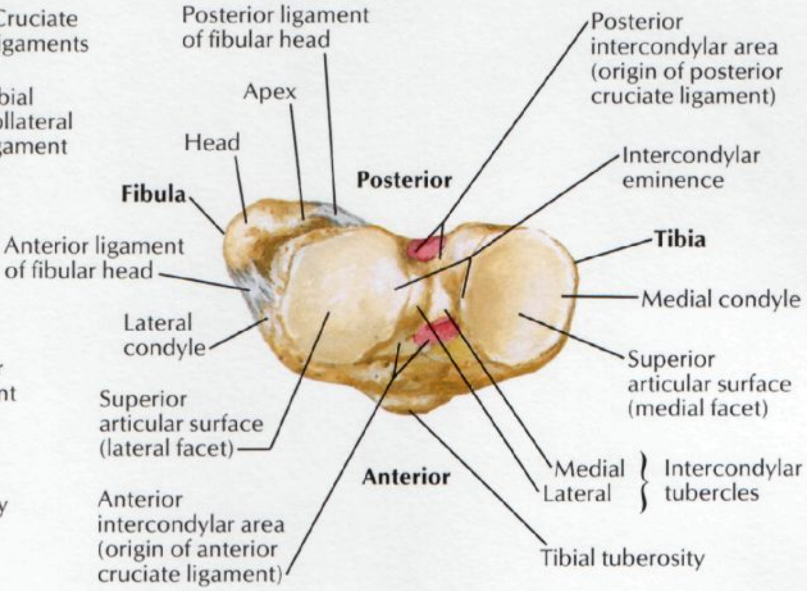
Tibia and Fibula (continued)

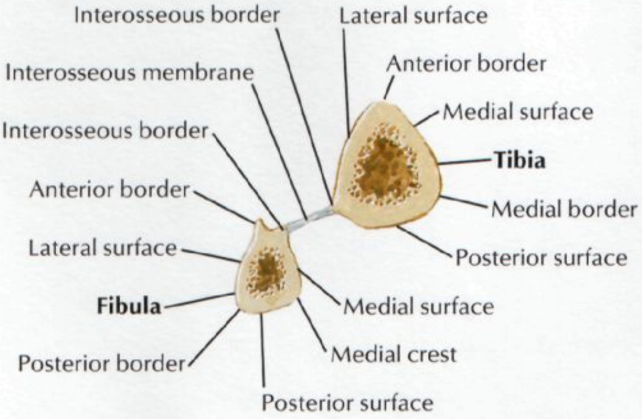
Anterior view with ligament attachments



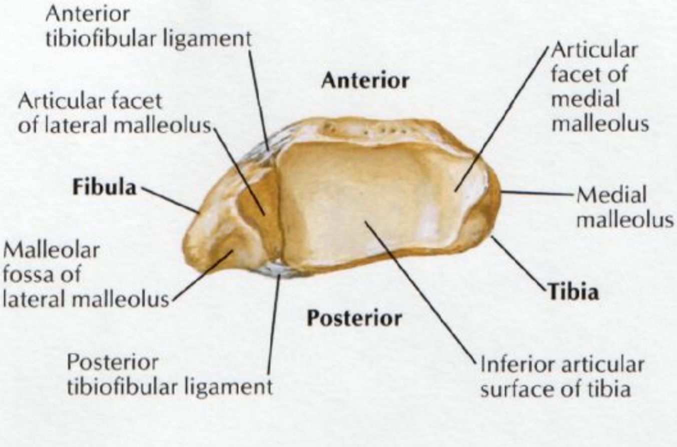
Superior view


Posterior ligament of fibular head
Posterior intercondylar area (origin of posterior cruciate ligament)
Apex
Head
Intercondylar eminence
Fibula
Posterior
Tibia
Anterior ligament of fibular head
Medial condyle
Lateral condyle
Superior articular surface (medial facet)
Superior articular surface (lateral facet)
Anterior
Medial
Lateral
Intercondylar tubercles
Anterior intercondylar area (origin of anterior cruciate ligament)
Tibial tuberosity

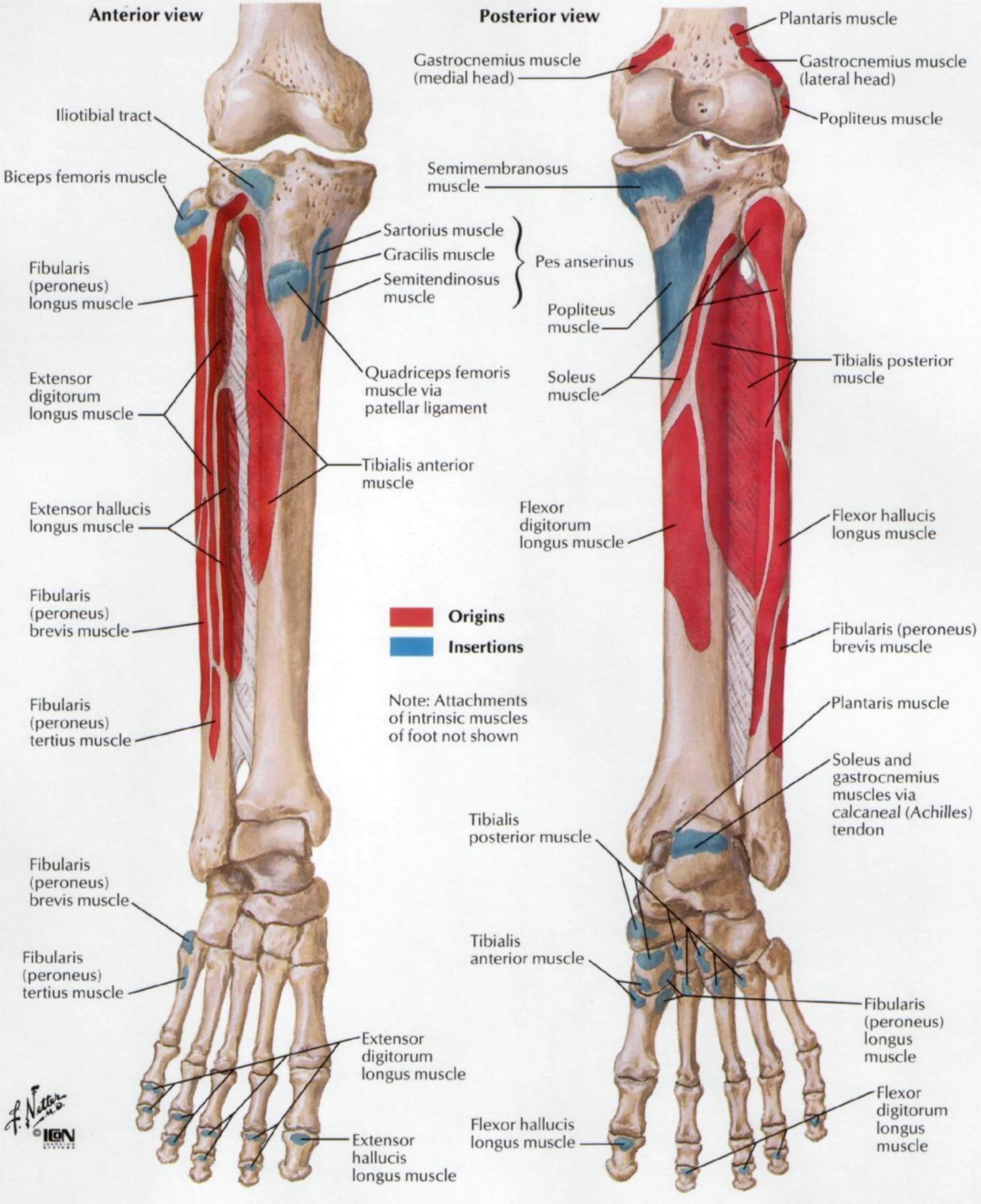
Cross section



Inferior view


Anterior tibiofibular ligament
Articular facet of medial malleolus
Anterior
Articular facet of lateral malleolus
Fibula
Medial malleolus
Malleolar fossa of lateral malleolus
Tibia
Posterior
Posterior tibiofibular ligament
Inferior articular surface of tibia

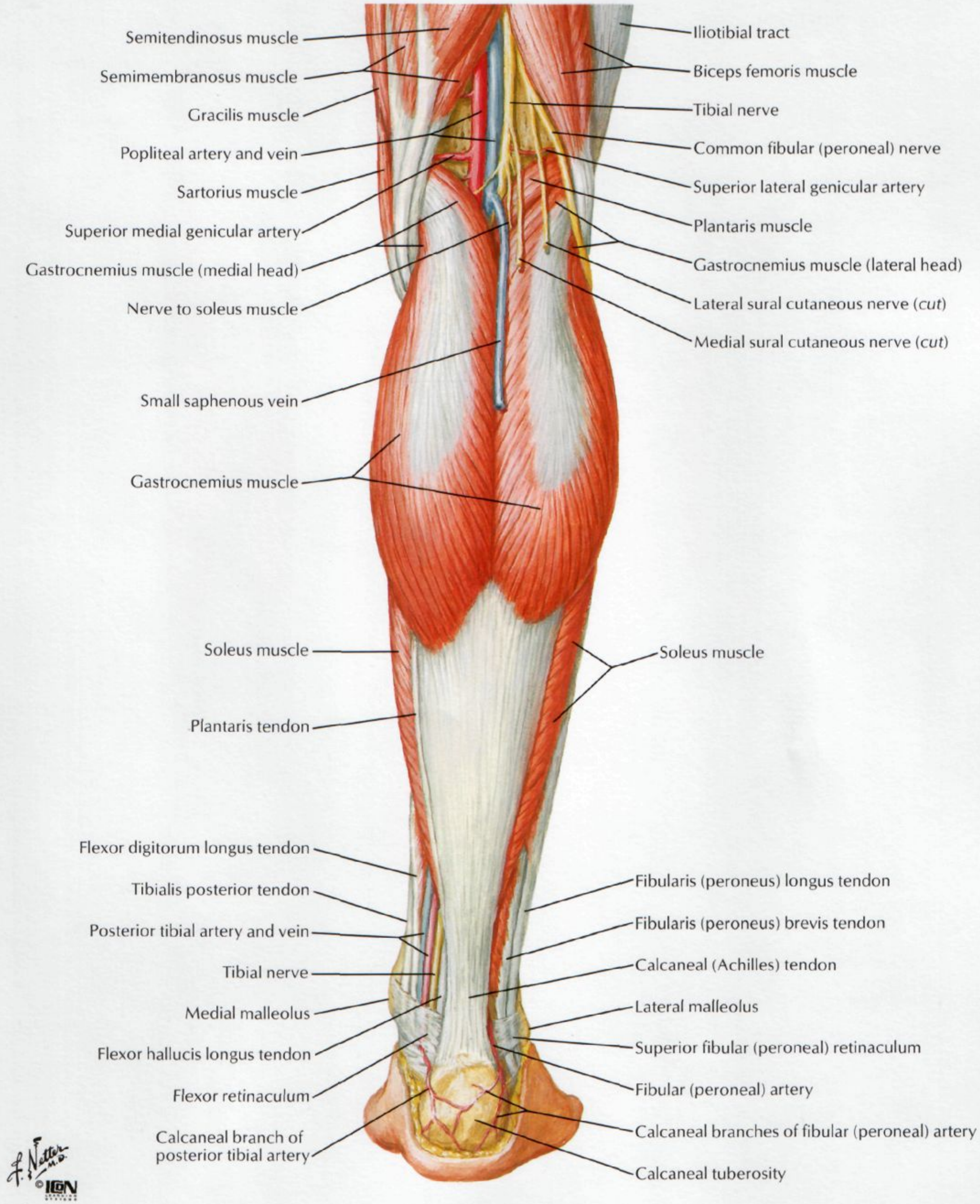
Attachments of Muscles of Leg


Anterior view
Iliotibial tract
Biceps femoris muscle
Fibularis (peroneus) longus muscle
Extensor digitorum longus muscle
Extensor hallucis longus muscle
Fibularis (peroneus) brevis muscle
Fibularis (peroneus) tertius muscle
Fibularis (peroneus) brevis muscle
Fibularis (peroneus) tertius muscle
Sartorius muscle
Gracilis muscle
Semitendinosus muscle
Pes anserinus
Quadriceps femoris muscle via patellar ligament
Tibialis anterior muscle
Extensor digitorum longus muscle
Extensor hallucis longus muscle
Posterior view
Plantaris muscle
Gastrocnemius muscle (medial head)
Gastrocnemius muscle (lateral head)
Popliteus muscle
Semimembranosus muscle
Popliteus muscle
Soleus muscle
Tibialis posterior muscle
Flexor digitorum longus muscle
Flexor hallucis longus muscle
Fibularis (peroneus) brevis muscle
Plantaris muscle
Soleus and gastrocnemius muscles via calcaneal (Achilles) tendon
Tibialis posterior muscle
Tibialis anterior muscle
Fibularis (peroneus) longus muscle
Flexor hallucis longus muscle
Flexor digitorum longus muscle
🟥 Origins
🟦 Insertions

Note: Attachments of intrinsic muscles of foot not shown

Muscles of Leg (Superficial Dissection): Posterior View

SEE ALSO PLATE 522


Semitendinosus muscle
Semimembranosus muscle
Gracilis muscle
Popliteal artery and vein
Sartorius muscle
Superior medial genicular artery
Gastrocnemius muscle (medial head)
Nerve to soleus muscle
Small saphenous vein
Gastrocnemius muscle
Soleus muscle
Plantaris tendon
Flexor digitorum longus tendon
Tibialis posterior tendon
Posterior tibial artery and vein
Tibial nerve
Medial malleolus
Flexor hallucis longus tendon
Flexor retinaculum
Calcaneal branch of posterior tibial artery
Iliotibial tract
Biceps femoris muscle
Tibial nerve
Common fibular (peroneal) nerve
Superior lateral genicular artery
Plantaris muscle
Gastrocnemius muscle (lateral head)
Lateral sural cutaneous nerve (*cut*)
Medial sural cutaneous nerve (*cut*)
Soleus muscle
Fibularis (peroneus) longus tendon
Fibularis (peroneus) brevis tendon
Calcaneal (Achilles) tendon
Lateral malleolus
Superior fibular (peroneal) retinaculum
Fibular (peroneal) artery
Calcaneal branches of fibular (peroneal) artery
Calcaneal tuberosity
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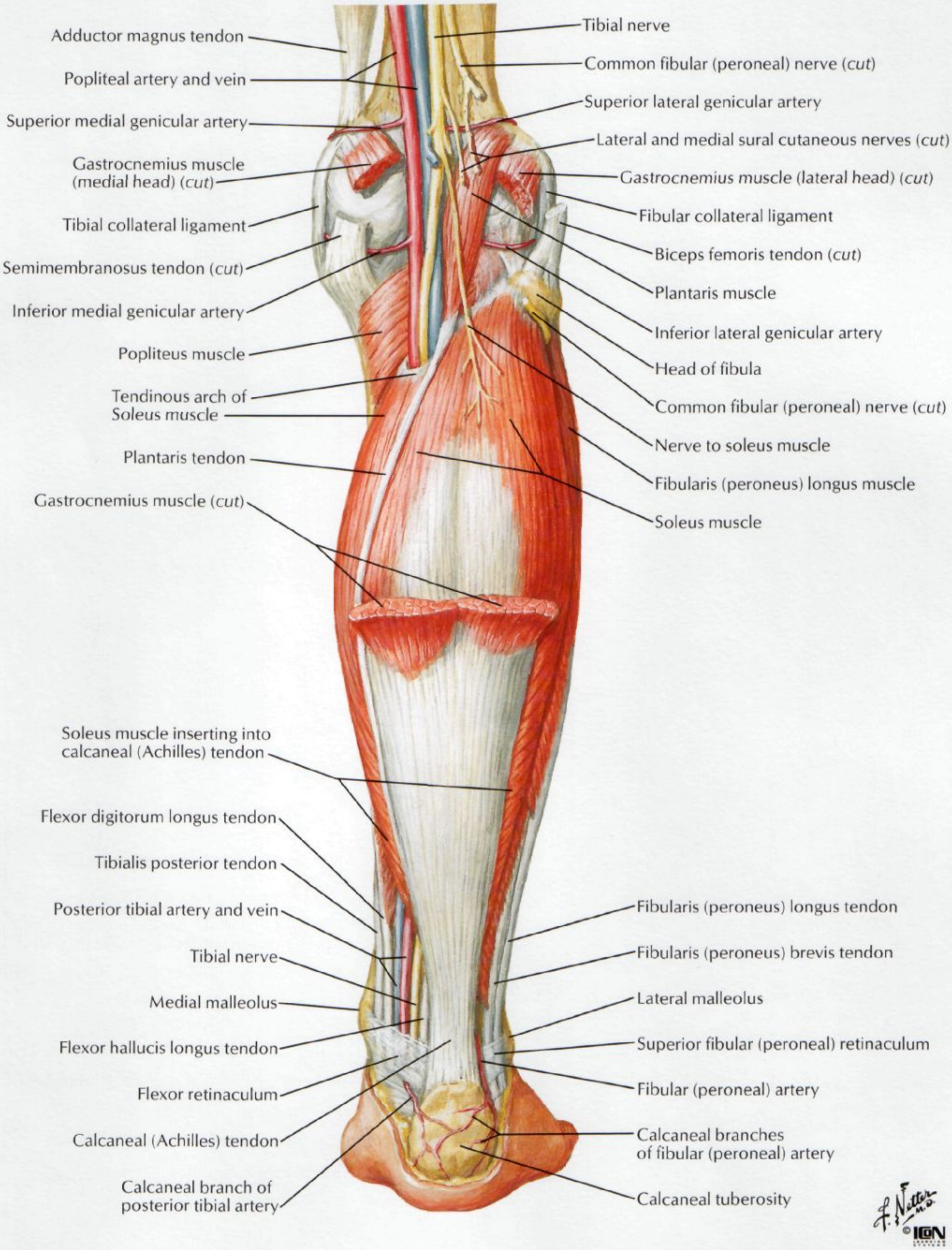
Muscles of Leg (Intermediate Dissection): Posterior View

SEE ALSO PLATE 523


Adductor magnus tendon
Popliteal artery and vein
Superior medial genicular artery
Gastrocnemius muscle (medial head) (*cut*)
Tibial collateral ligament
Semimembranosus tendon (*cut*)
Inferior medial genicular artery
Popliteus muscle
Tendinous arch of
Soleus muscle
Plantaris tendon
Gastrocnemius muscle (*cut*)
Soleus muscle inserting into calcaneal (Achilles) tendon
Flexor digitorum longus tendon
Tibialis posterior tendon
Posterior tibial artery and vein
Tibial nerve
Medial malleolus
Flexor hallucis longus tendon
Flexor retinaculum
Calcaneal (Achilles) tendon
Calcaneal branch of posterior tibial artery
Tibial nerve
Common fibular (peroneal) nerve (*cut*)
Superior lateral genicular artery
Lateral and medial sural cutaneous nerves (*cut*)
Gastrocnemius muscle (lateral head) (*cut*)
Fibular collateral ligament
Biceps femoris tendon (*cut*)
Plantaris muscle
Inferior lateral genicular artery
Head of fibula
Common fibular (peroneal) nerve (*cut*)
Nerve to soleus muscle
Fibularis (peroneus) longus muscle
Soleus muscle
Fibularis (peroneus) longus tendon
Fibularis (peroneus) brevis tendon
Lateral malleolus
Superior fibular (peroneal) retinaculum
Fibular (peroneal) artery
Calcaneal branches of fibular (peroneal) artery
Calcaneal tuberosity
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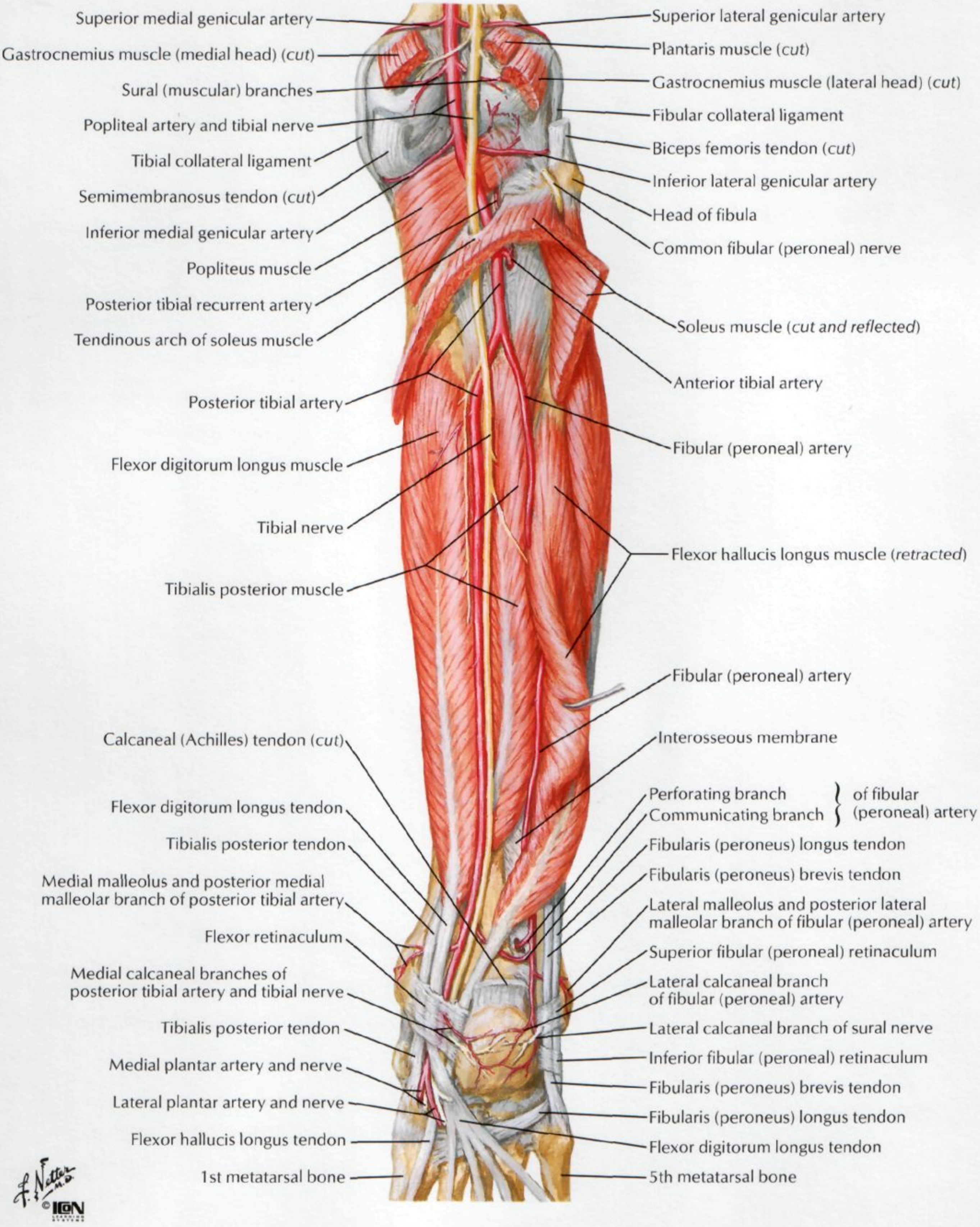
Muscles of Leg (Deep Dissection): Posterior View

SEE ALSO PLATE 523


Superior medial genicular artery
Gastrocnemius muscle (medial head) (*cut*)
Sural (muscular) branches
Popliteal artery and tibial nerve
Tibial collateral ligament
Semimembranosus tendon (*cut*)
Inferior medial genicular artery
Popliteus muscle
Posterior tibial recurrent artery
Tendinous arch of soleus muscle
Posterior tibial artery
Flexor digitorum longus muscle
Tibial nerve
Tibialis posterior muscle
Calcaneal (Achilles) tendon (*cut*)
Flexor digitorum longus tendon
Tibialis posterior tendon
Medial malleolus and posterior medial malleolar branch of posterior tibial artery
Flexor retinaculum
Medial calcaneal branches of posterior tibial artery and tibial nerve
Tibialis posterior tendon
Medial plantar artery and nerve
Lateral plantar artery and nerve
Flexor hallucis longus tendon
1st metatarsal bone
Superior lateral genicular artery
Plantaris muscle (*cut*)
Gastrocnemius muscle (lateral head) (*cut*)
Fibular collateral ligament
Biceps femoris tendon (*cut*)
Inferior lateral genicular artery
Head of fibula
Common fibular (peroneal) nerve
Soleus muscle (*cut and reflected*)
Anterior tibial artery
Fibular (peroneal) artery
Flexor hallucis longus muscle (*retracted*)
Fibular (peroneal) artery
Interosseous membrane
Perforating branch } of fibular
Communicating branch } (peroneal) artery
Fibularis (peroneus) longus tendon
Fibularis (peroneus) brevis tendon
Lateral malleolus and posterior lateral malleolar branch of fibular (peroneal) artery
Superior fibular (peroneal) retinaculum
Lateral calcaneal branch of fibular (peroneal) artery
Lateral calcaneal branch of sural nerve
Inferior fibular (peroneal) retinaculum
Fibularis (peroneus) brevis tendon
Fibularis (peroneus) longus tendon
Flexor digitorum longus tendon
5th metatarsal bone
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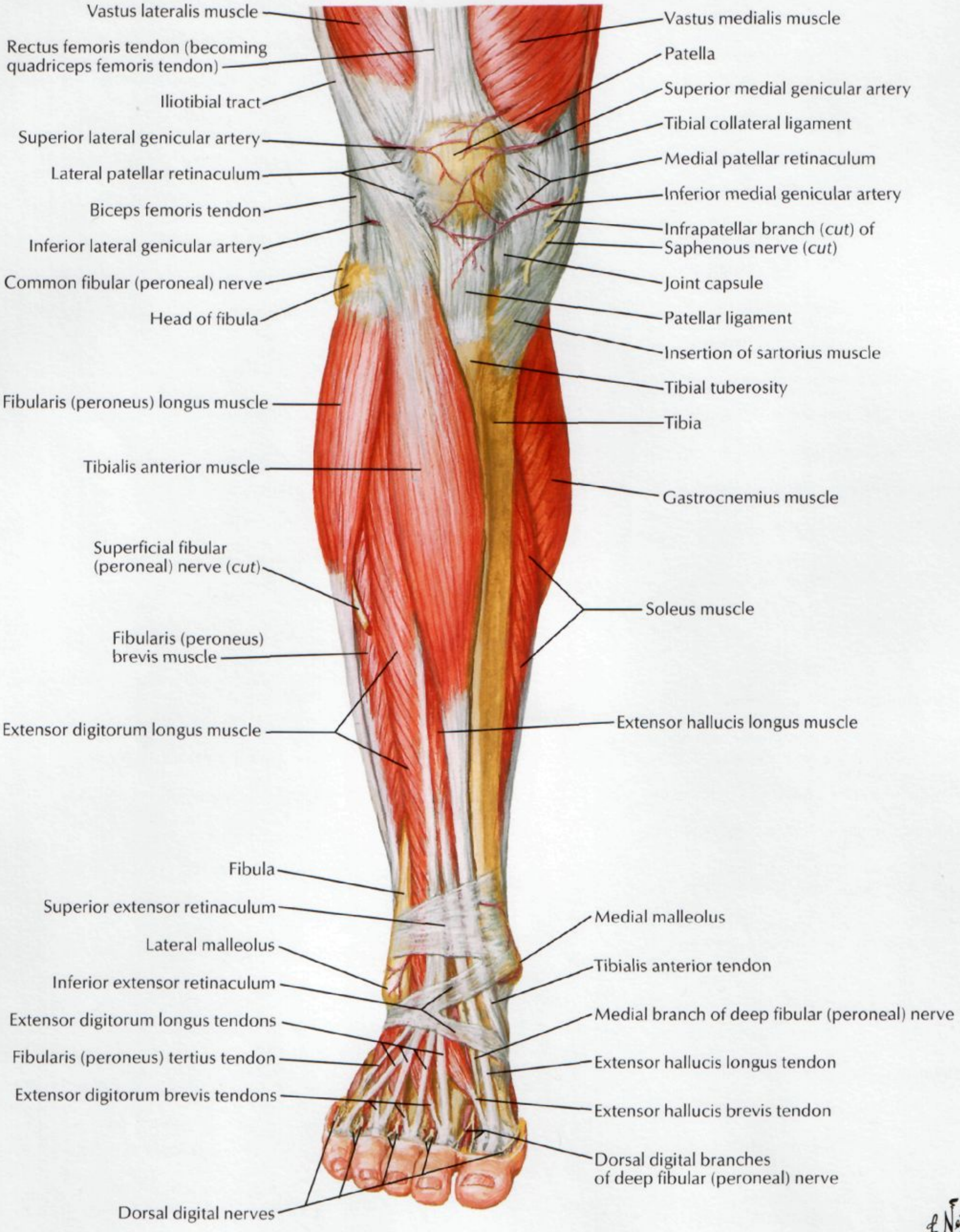
Muscles of Leg (Superficial Dissection): Anterior View

SEE ALSO PLATE 524


Vastus lateralis muscle
Rectus femoris tendon (becoming quadriceps femoris tendon)
Iliotibial tract
Superior lateral genicular artery
Lateral patellar retinaculum
Biceps femoris tendon
Inferior lateral genicular artery
Common fibular (peroneal) nerve
Head of fibula
Fibularis (peroneus) longus muscle
Tibialis anterior muscle
Superficial fibular (peroneal) nerve (*cut*)
Fibularis (peroneus) brevis muscle
Extensor digitorum longus muscle
Fibula
Superior extensor retinaculum
Lateral malleolus
Inferior extensor retinaculum
Extensor digitorum longus tendons
Fibularis (peroneus) tertius tendon
Extensor digitorum brevis tendons
Dorsal digital nerves
Vastus medialis muscle
Patella
Superior medial genicular artery
Tibial collateral ligament
Medial patellar retinaculum
Inferior medial genicular artery
Infrapatellar branch (*cut*) of
Saphenous nerve (*cut*)
Joint capsule
Patellar ligament
Insertion of sartorius muscle
Tibial tuberosity
Tibia
Gastrocnemius muscle
Soleus muscle
Extensor hallucis longus muscle
Medial malleolus
Tibialis anterior tendon
Medial branch of deep fibular (peroneal) nerve
Extensor hallucis longus tendon
Extensor hallucis brevis tendon
Dorsal digital branches of deep fibular (peroneal) nerve
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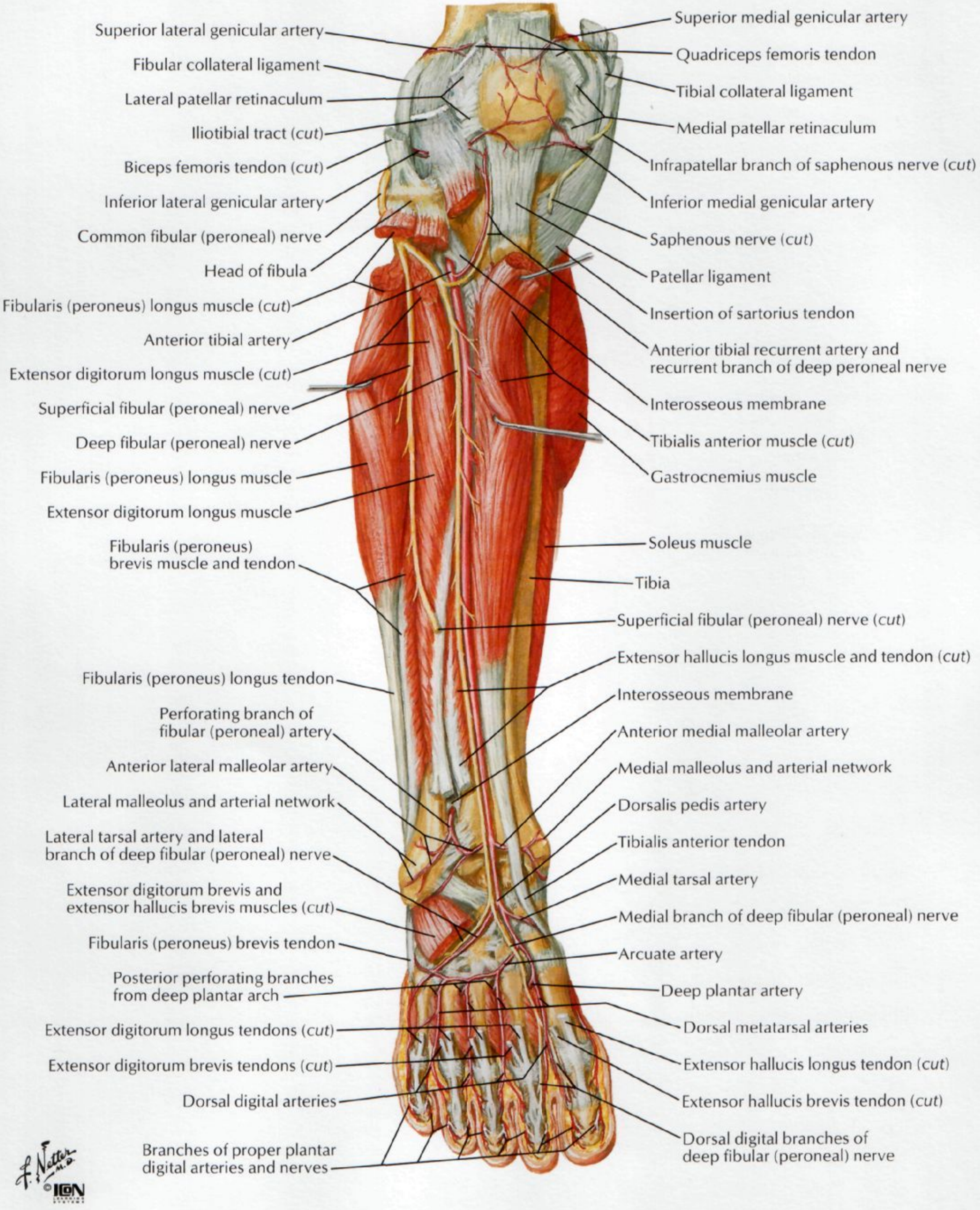
Muscles of Leg (Deep Dissection): Anterior View

SEE ALSO PLATE 524


Superior lateral genicular artery
Fibular collateral ligament
Lateral patellar retinaculum
Iliotibial tract (*cut*)
Biceps femoris tendon (*cut*)
Inferior lateral genicular artery
Common fibular (peroneal) nerve
Head of fibula
Fibularis (peroneus) longus muscle (*cut*)
Anterior tibial artery
Extensor digitorum longus muscle (*cut*)
Superficial fibular (peroneal) nerve
Deep fibular (peroneal) nerve
Fibularis (peroneus) longus muscle
Extensor digitorum longus muscle
Fibularis (peroneus) brevis muscle and tendon
Fibularis (peroneus) longus tendon
Perforating branch of fibular (peroneal) artery
Anterior lateral malleolar artery
Lateral malleolus and arterial network
Lateral tarsal artery and lateral branch of deep fibular (peroneal) nerve
Extensor digitorum brevis and extensor hallucis brevis muscles (*cut*)
Fibularis (peroneus) brevis tendon
Posterior perforating branches from deep plantar arch
Extensor digitorum longus tendons (*cut*)
Extensor digitorum brevis tendons (*cut*)
Dorsal digital arteries
Branches of proper plantar digital arteries and nerves
Superior medial genicular artery
Quadriceps femoris tendon
Tibial collateral ligament
Medial patellar retinaculum
Infrapatellar branch of saphenous nerve (*cut*)
Inferior medial genicular artery
Saphenous nerve (*cut*)
Patellar ligament
Insertion of sartorius tendon
Anterior tibial recurrent artery and recurrent branch of deep peroneal nerve
Interosseous membrane
Tibialis anterior muscle (*cut*)
Gastrocnemius muscle
Soleus muscle
Tibia
Superficial fibular (peroneal) nerve (*cut*)
Extensor hallucis longus muscle and tendon (*cut*)
Interosseous membrane
Anterior medial malleolar artery
Medial malleolus and arterial network
Dorsalis pedis artery
Tibialis anterior tendon
Medial tarsal artery
Medial branch of deep fibular (peroneal) nerve
Arcuate artery
Deep plantar artery
Dorsal metatarsal arteries
Extensor hallucis longus tendon (*cut*)
Extensor hallucis brevis tendon (*cut*)
Dorsal digital branches of deep fibular (peroneal) nerve
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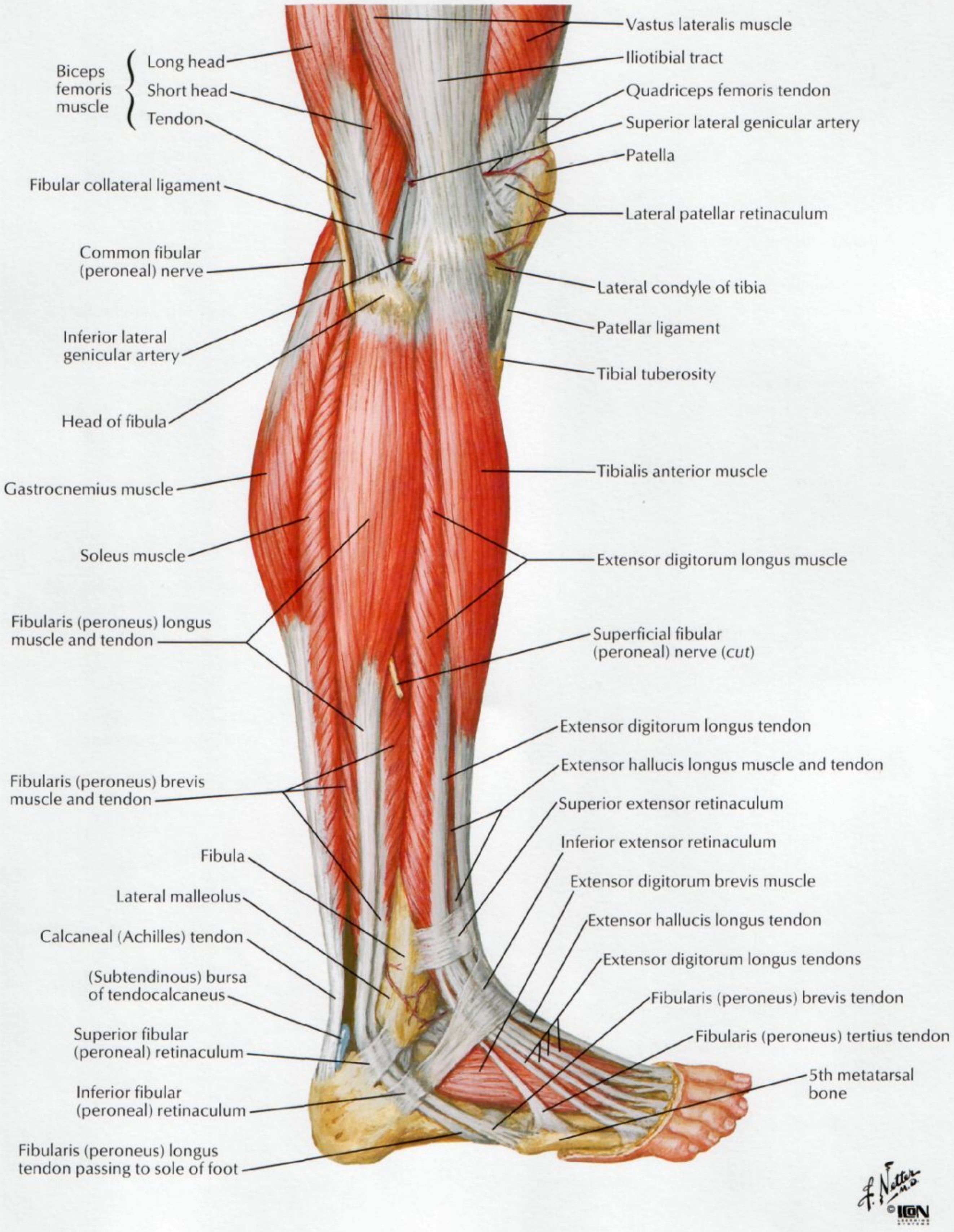
Muscles of Leg: Lateral View

SEE ALSO PLATE 524


Biceps femoris muscle
Long head
Short head
Tendon
Fibular collateral ligament
Common fibular (peroneal) nerve
Inferior lateral genicular artery
Head of fibula
Gastrocnemius muscle
Soleus muscle
Fibularis (peroneus) longus muscle and tendon
Fibularis (peroneus) brevis muscle and tendon
Fibula
Lateral malleolus
Calcaneal (Achilles) tendon
(Subtendinous) bursa of tendocalcaneus
Superior fibular (peroneal) retinaculum
Inferior fibular (peroneal) retinaculum
Fibularis (peroneus) longus tendon passing to sole of foot
Vastus lateralis muscle
Iliotibial tract
Quadriceps femoris tendon
Superior lateral genicular artery
Patella
Lateral patellar retinaculum
Lateral condyle of tibia
Patellar ligament
Tibial tuberosity
Tibialis anterior muscle
Extensor digitorum longus muscle
Superficial fibular (peroneal) nerve (*cut*)
Extensor digitorum longus tendon
Extensor hallucis longus muscle and tendon
Superior extensor retinaculum
Inferior extensor retinaculum
Extensor digitorum brevis muscle
Extensor hallucis longus tendon
Extensor digitorum longus tendons
Fibularis (peroneus) brevis tendon
Fibularis (peroneus) tertius tendon
5th metatarsal bone
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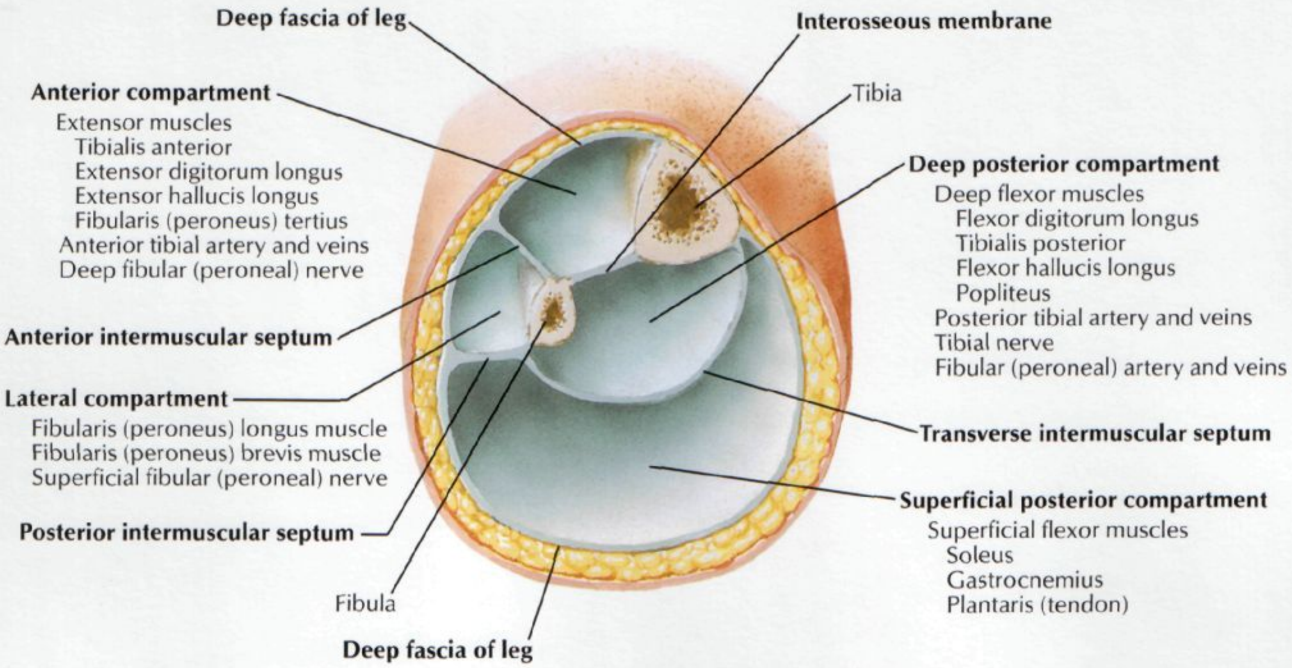
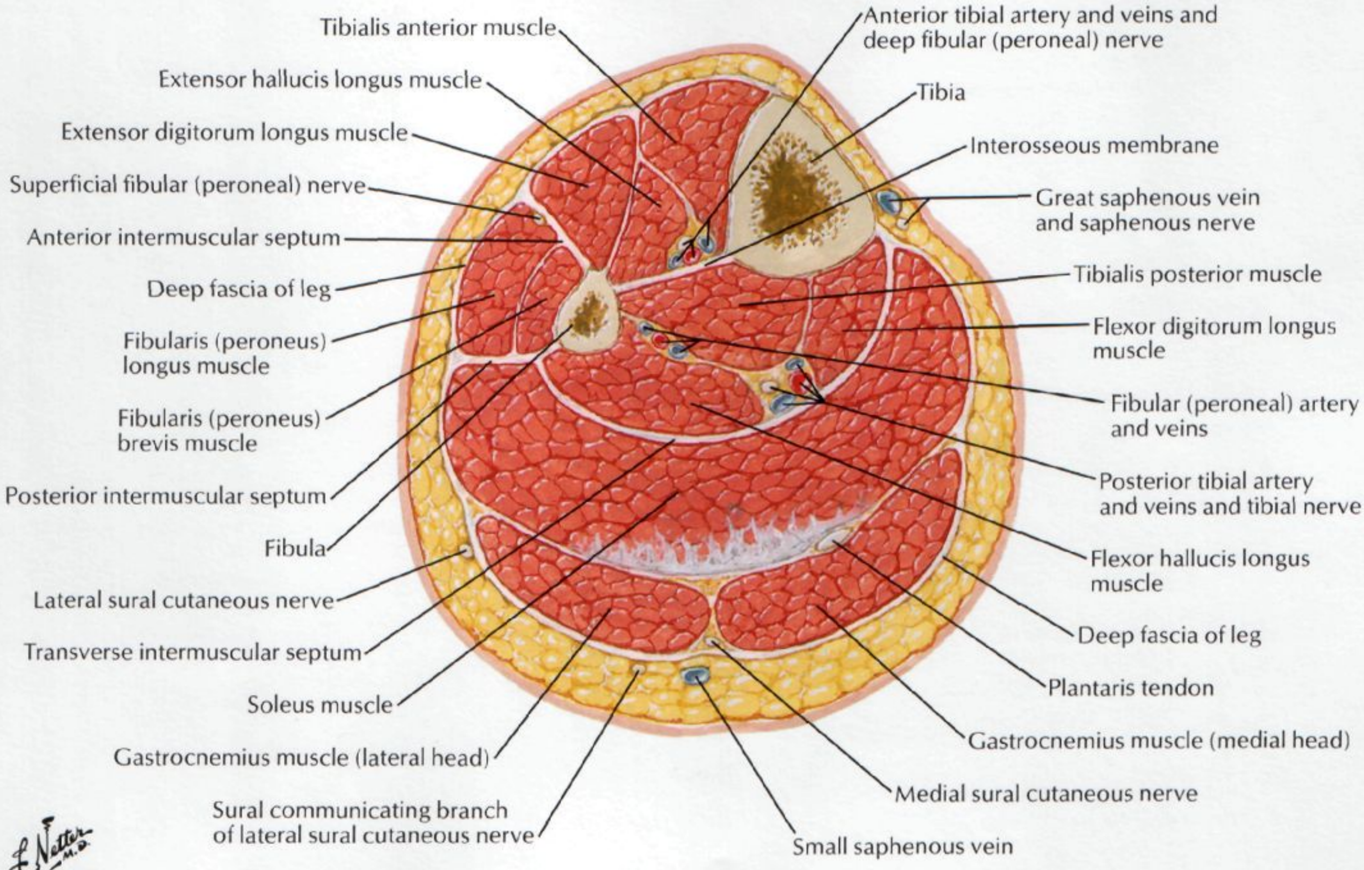
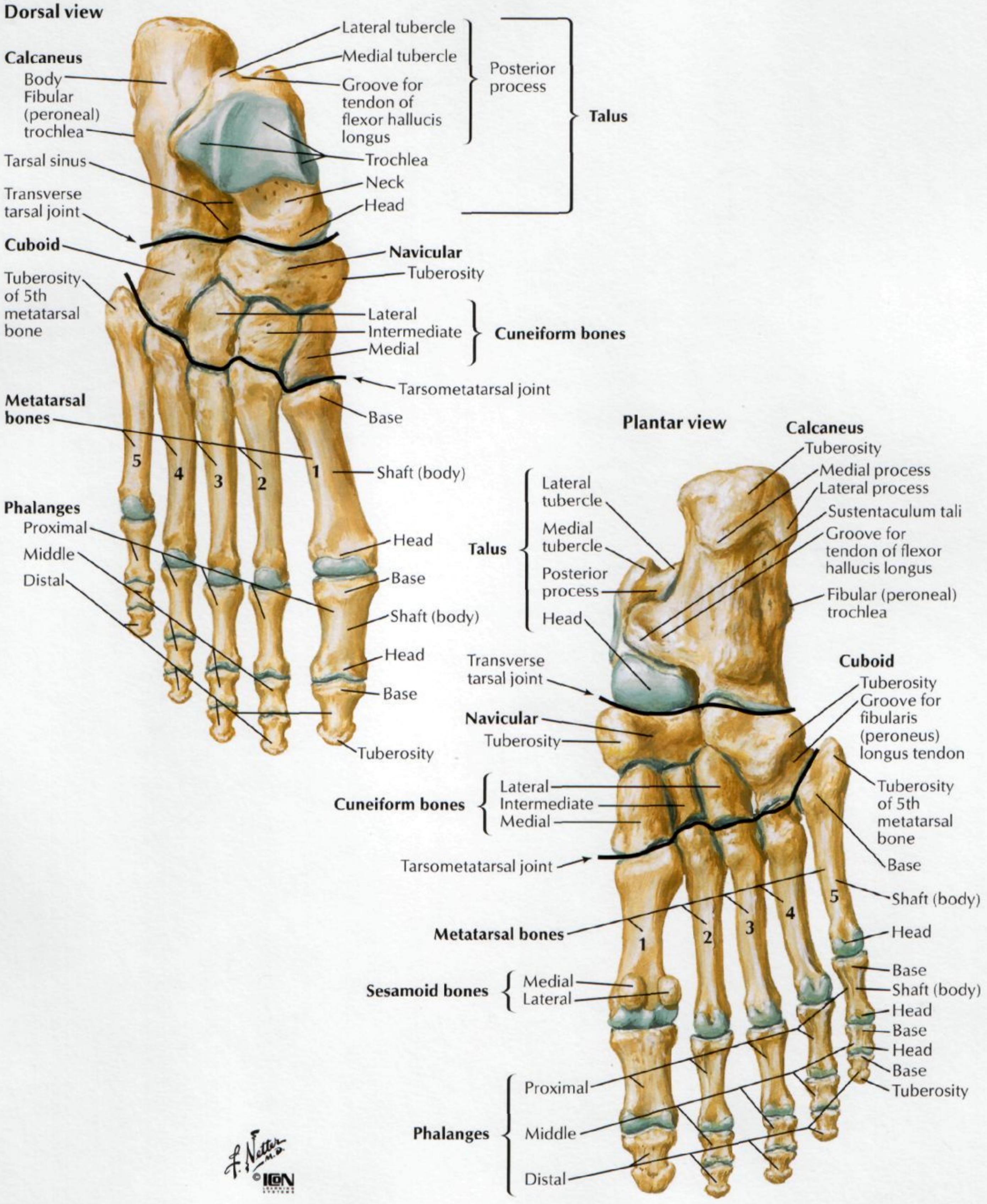
Leg: Cross Sections and Fascial Compartments


Deep fascia of leg
Anterior compartment
Extensor muscles
Tibialis anterior
Extensor digitorum longus
Extensor hallucis longus
Fibularis (peroneus) tertius
Anterior tibial artery and veins
Deep fibular (peroneal) nerve
Anterior intermuscular septum
Lateral compartment
Fibularis (peroneus) longus muscle
Fibularis (peroneus) brevis muscle
Superficial fibular (peroneal) nerve
Posterior intermuscular septum
Fibula
Deep fascia of leg
Interosseous membrane
Tibia
Deep posterior compartment
Deep flexor muscles
Flexor digitorum longus
Tibialis posterior
Flexor hallucis longus
Popliteus
Posterior tibial artery and veins
Tibial nerve
Fibular (peroneal) artery and veins
Transverse intermuscular septum
Superficial posterior compartment
Superficial flexor muscles
Soleus
Gastrocnemius
Plantaris (tendon)

Cross section just above middle of leg


Tibialis anterior muscle
Extensor hallucis longus muscle
Extensor digitorum longus muscle
Superficial fibular (peroneal) nerve
Anterior intermuscular septum
Deep fascia of leg
Fibularis (peroneus) longus muscle
Fibularis (peroneus) brevis muscle
Posterior intermuscular septum
Fibula
Lateral sural cutaneous nerve
Transverse intermuscular septum
Soleus muscle
Gastrocnemius muscle (lateral head)
Sural communicating branch of lateral sural cutaneous nerve
Anterior tibial artery and veins and deep fibular (peroneal) nerve
Tibia
Interosseous membrane
Great saphenous vein and saphenous nerve
Tibialis posterior muscle
Flexor digitorum longus muscle
Fibular (peroneal) artery and veins
Posterior tibial artery and veins and tibial nerve
Flexor hallucis longus muscle
Deep fascia of leg
Plantaris tendon
Gastrocnemius muscle (medial head)
Medial sural cutaneous nerve
Small saphenous vein

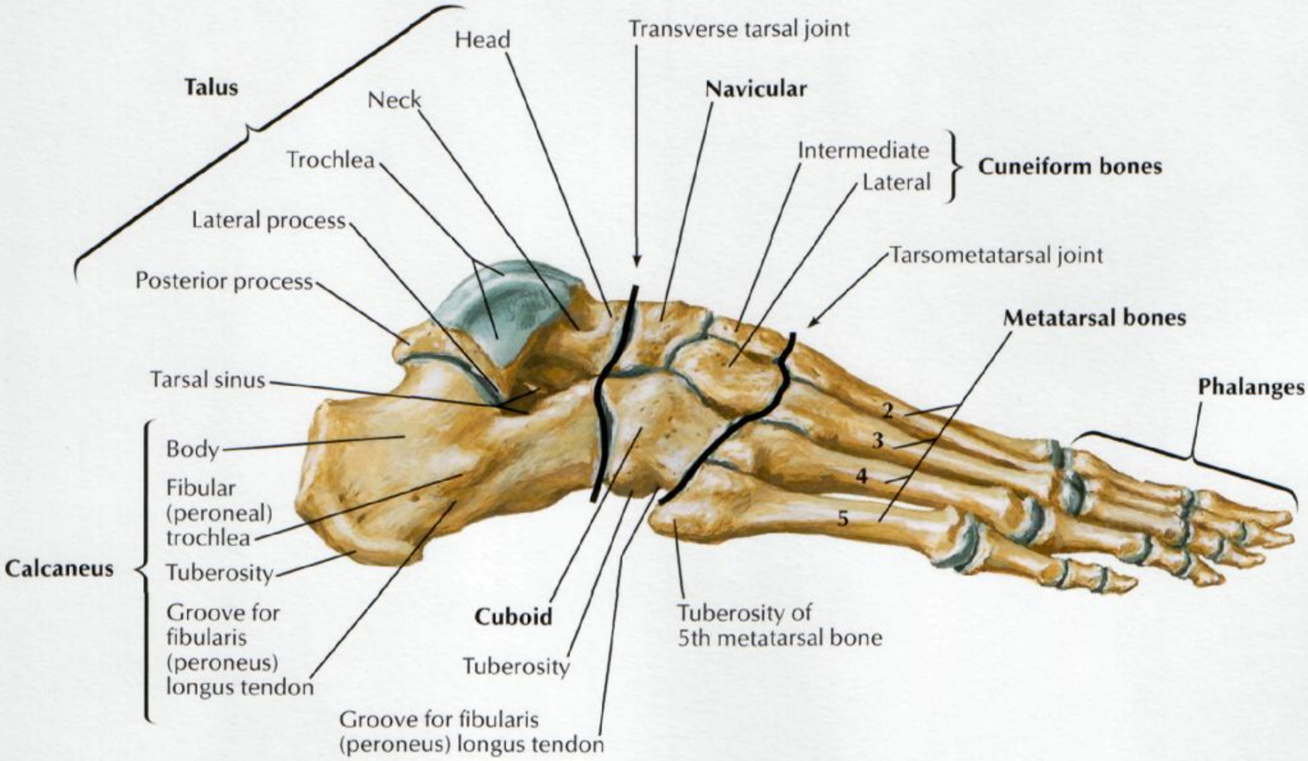
Bones of Foot


Dorsal view

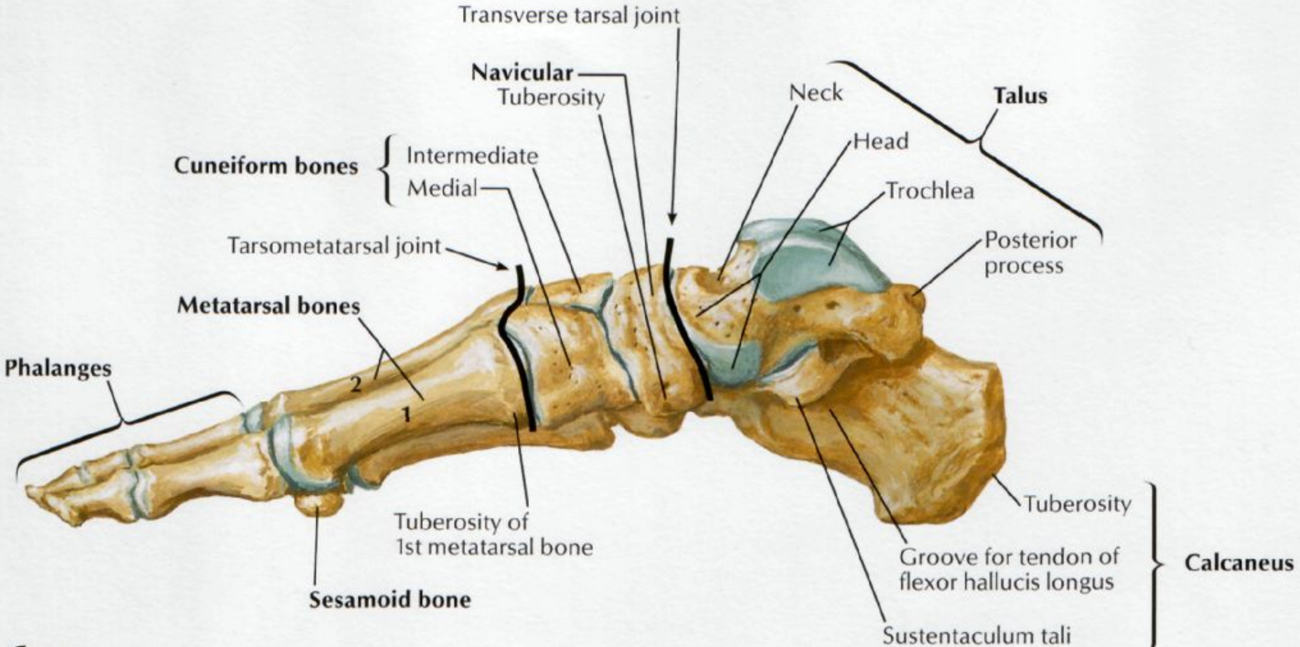
Plantar view

Bones of Foot (continued)

Lateral view



Medial view



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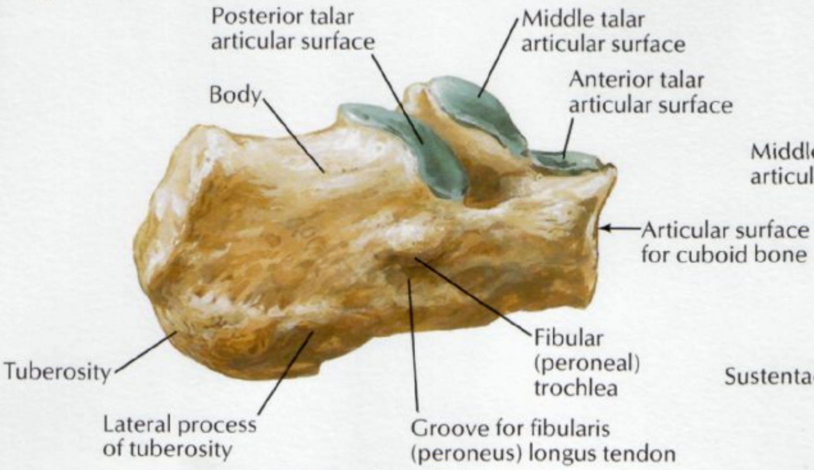
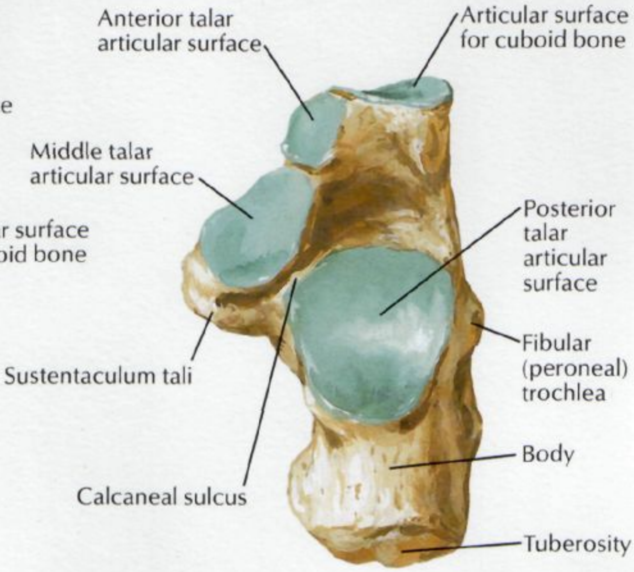
Calcaneus

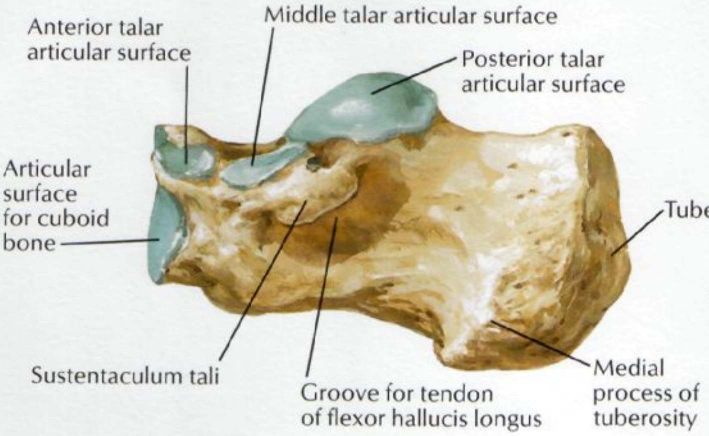
Right foot


Posterior talar articular surface
Middle talar articular surface
Body
Anterior talar articular surface
Articular surface for cuboid bone
Tuberosity
Fibular (peroneal) trochlea
Lateral process of tuberosity
Groove for fibularis (peroneus) longus tendon

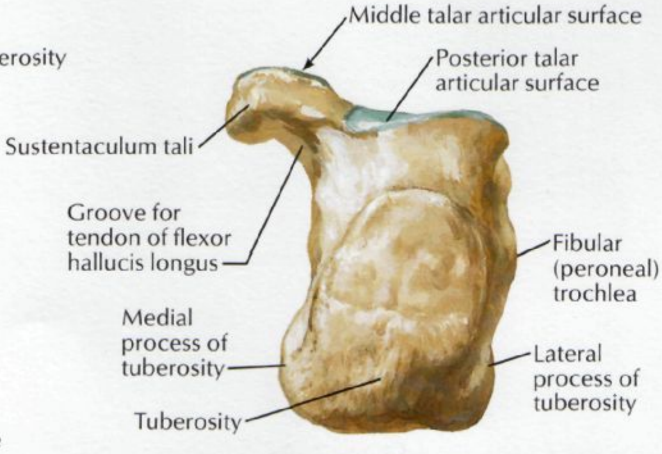
Lateral view


Anterior talar articular surface
Articular surface for cuboid bone
Middle talar articular surface
Posterior talar articular surface
Fibular (peroneal) trochlea
Sustentaculum tali
Body
Calcaneal sulcus
Tuberosity

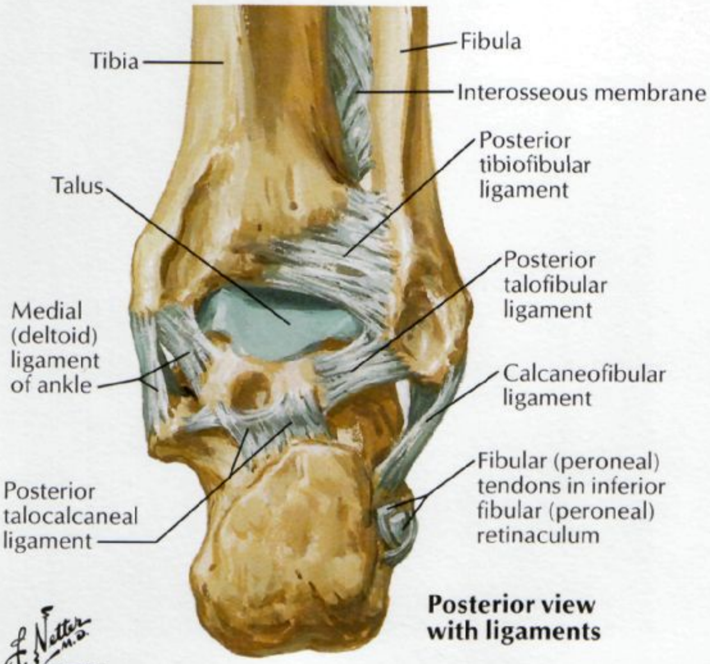
Superior view


Middle talar articular surface
Anterior talar articular surface
Posterior talar articular surface
Articular surface for cuboid bone
Tuberosity
Sustentaculum tali
Groove for tendon of flexor hallucis longus
Medial process of tuberosity

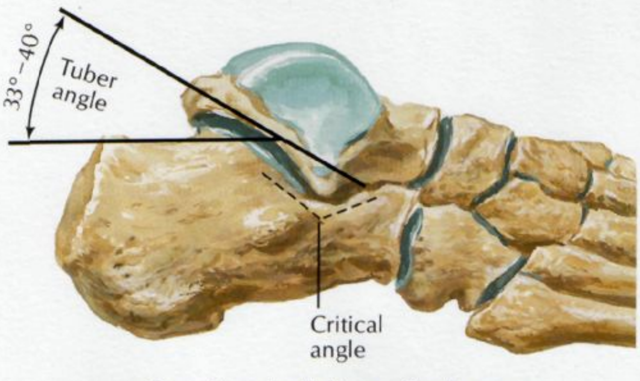
Medial view


Middle talar articular surface
Posterior talar articular surface
Sustentaculum tali
Groove for tendon of flexor hallucis longus
Fibular (peroneal) trochlea
Medial process of tuberosity
Lateral process of tuberosity
Tuberosity

Posterior view

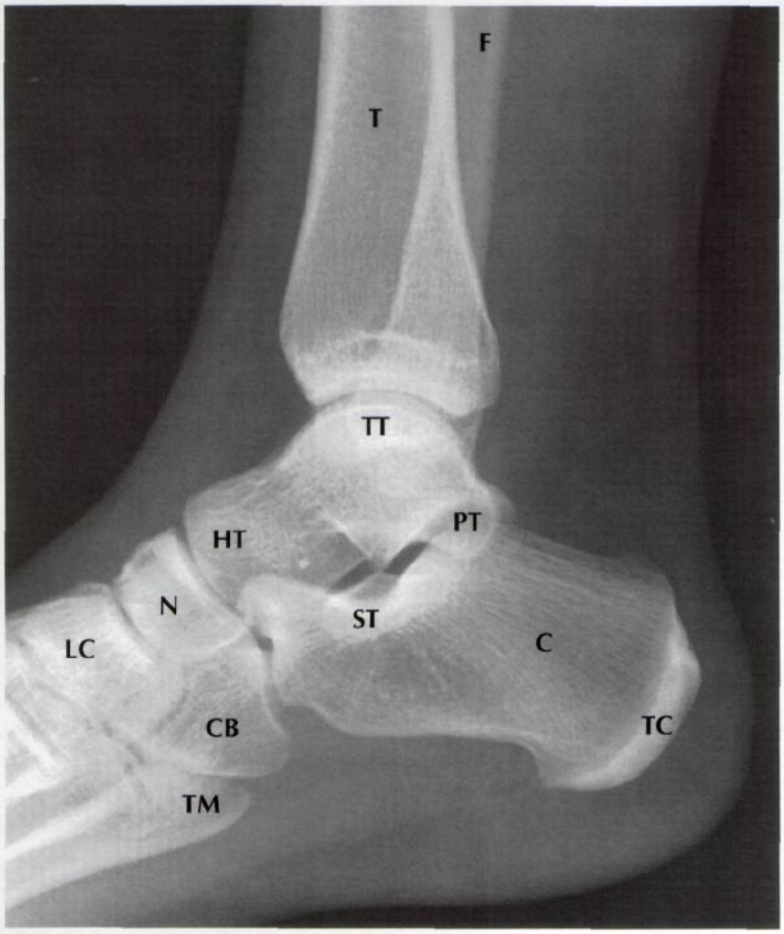

Tibia
Fibula
Interosseous membrane
Posterior tibiofibular ligament
Talus
Posterior talofibular ligament
Medial (deltoid) ligament of ankle
Calcaneofibular ligament
Fibular (peroneal) tendons in inferior fibular (peroneal) retinaculum
Posterior talocalcaneal ligament

Posterior view with ligaments



Functional relations of calcaneus

Ankle: Radiographs

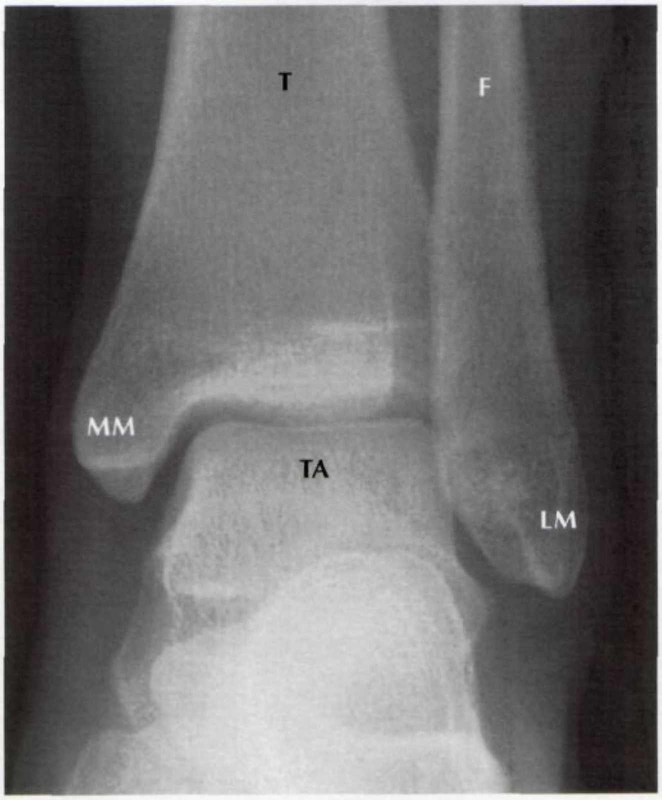


Lateral view

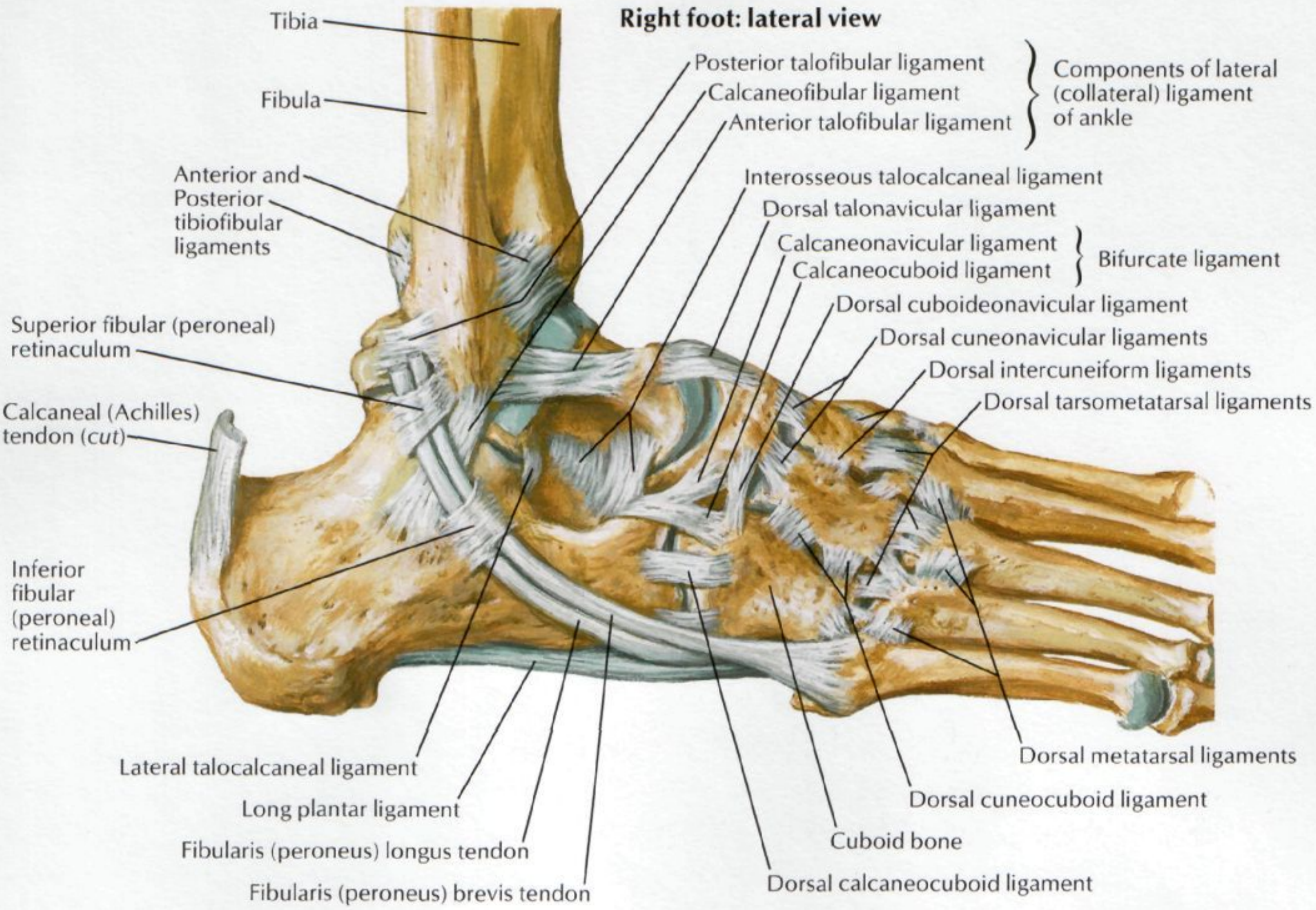
C	Calcaneus
CB	Cuboid
F	Fibula
HT	Head of talus
LC	Lateral cuneiform
N	Navicular
PT	Posterior process of talus
ST	Sustentaculum tali of calcaneus
T	Tibia
TC	Tuberosity of calcaneus
TM	Tuberosity of 5th metatarsal
TT	Trochlea of talus

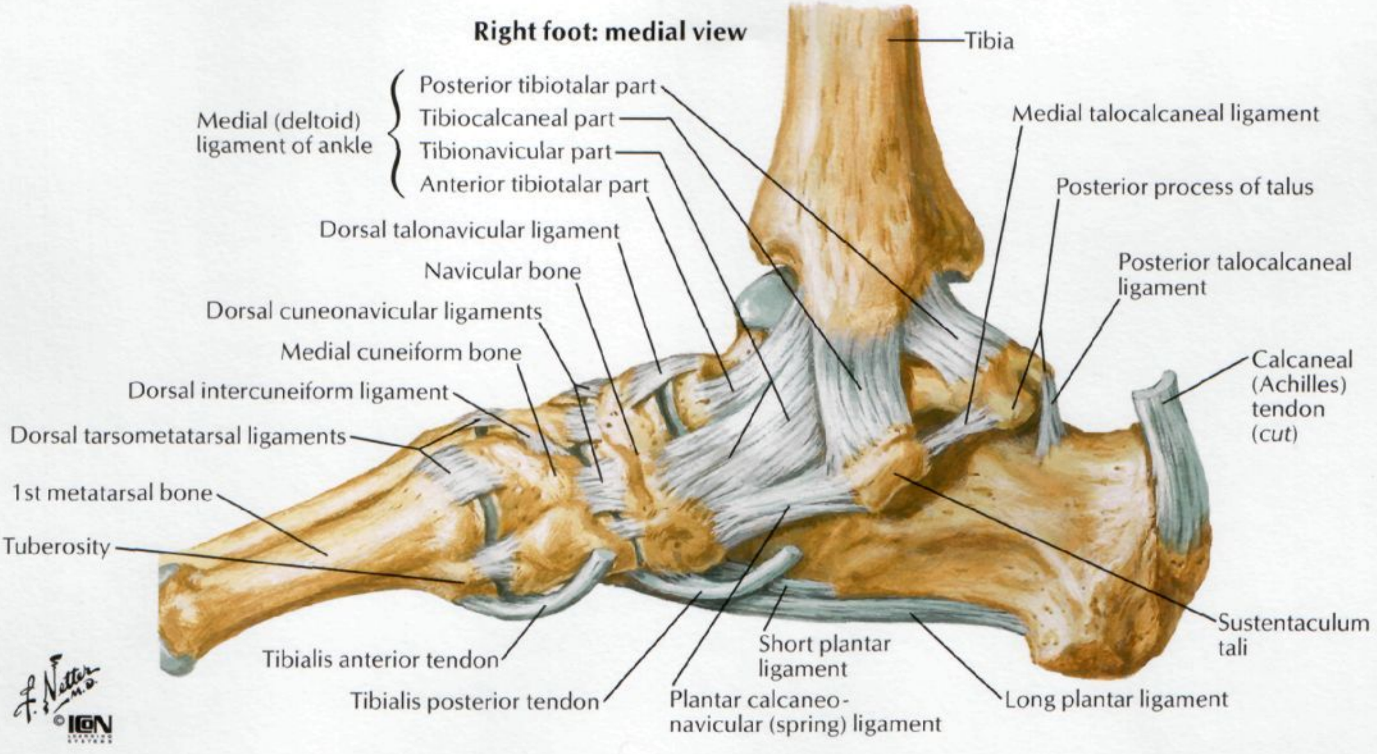
Anterior view

F	Fibula
LM	Lateral malleolus
MM	Medial malleolus
T	Tibia
TA	Talus

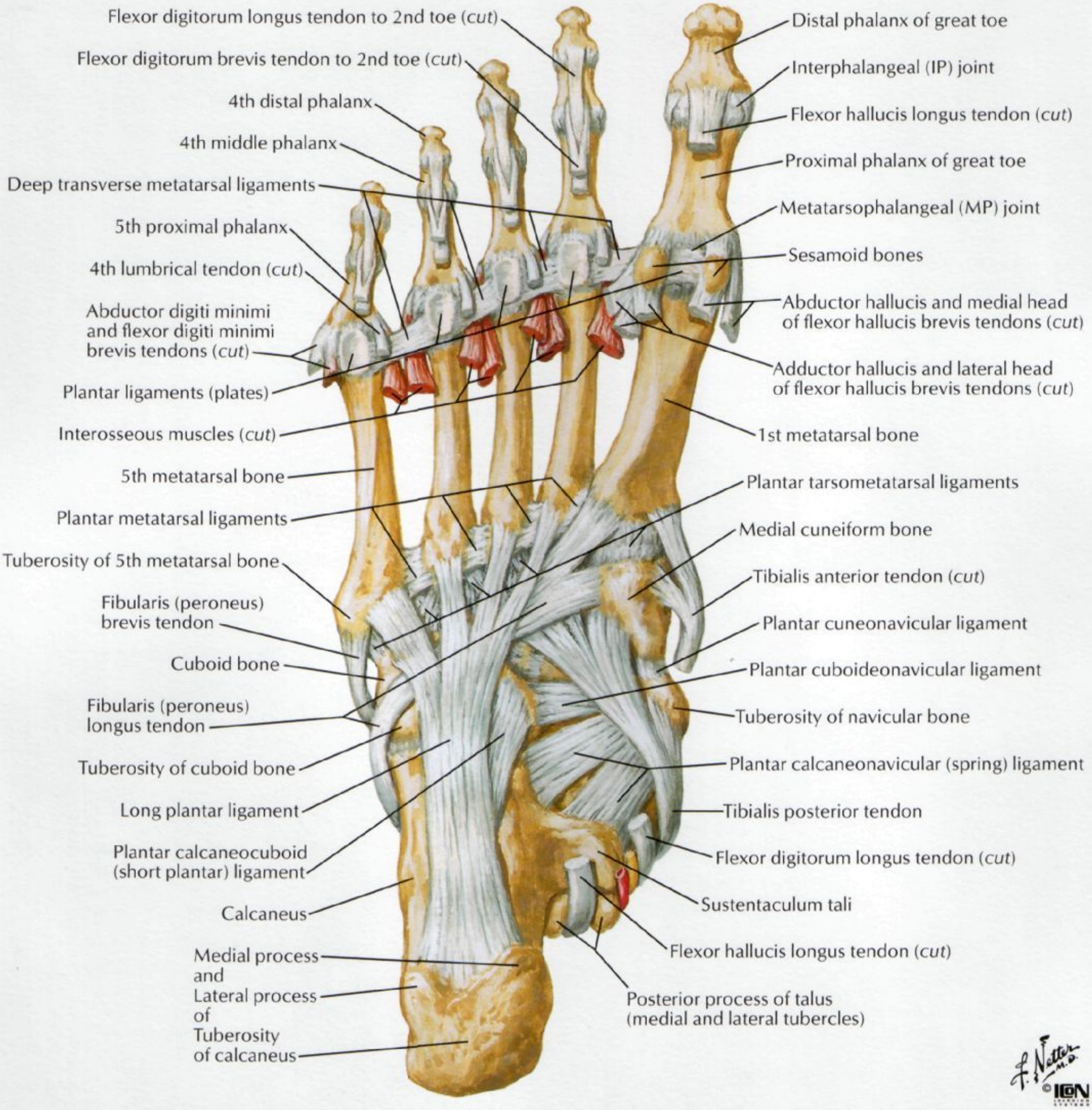


Ligaments and Tendons of Ankle


Right foot: lateral view
Tibia
Fibula
Anterior and
Posterior
tibiofibular
ligaments
Superior fibular (peroneal)
retinaculum
Calcaneal (Achilles)
tendon (*cut*)
Inferior
fibular
(peroneal)
retinaculum
Posterior talofibular ligament
Calcaneofibular ligament
Anterior talofibular ligament
Components of lateral
(collateral) ligament
of ankle
Interosseous talocalcaneal ligament
Dorsal talonavicular ligament
Calcaneonavicular ligament
Calcaneocuboid ligament
Bifurcate ligament
Dorsal cuboideonavicular ligament
Dorsal cuneonavicular ligaments
Dorsal intercuneiform ligaments
Dorsal tarsometatarsal ligaments
Lateral talocalcaneal ligament
Long plantar ligament
Fibularis (peroneus) longus tendon
Fibularis (peroneus) brevis tendon
Dorsal metatarsal ligaments
Dorsal cuneocuboid ligament
Cuboid bone
Dorsal calcaneocuboid ligament


Right foot: medial view

Ligaments and Tendons of Foot: Plantar View


Flexor digitorum longus tendon to 2nd toe (*cut*)
Flexor digitorum brevis tendon to 2nd toe (*cut*)
4th distal phalanx
4th middle phalanx
Deep transverse metatarsal ligaments
5th proximal phalanx
4th lumbrical tendon (*cut*)
Abductor digiti minimi and flexor digiti minimi brevis tendons (*cut*)
Plantar ligaments (plates)
Interosseous muscles (*cut*)
5th metatarsal bone
Plantar metatarsal ligaments
Tuberosity of 5th metatarsal bone
Fibularis (peroneus) brevis tendon
Cuboid bone
Fibularis (peroneus) longus tendon
Tuberosity of cuboid bone
Long plantar ligament
Plantar calcaneocuboid (short plantar) ligament
Calcaneus
Medial process and Lateral process of Tuberosity of calcaneus
Distal phalanx of great toe
Interphalangeal (IP) joint
Flexor hallucis longus tendon (*cut*)
Proximal phalanx of great toe
Metatarsophalangeal (MP) joint
Sesamoid bones
Abductor hallucis and medial head of flexor hallucis brevis tendons (*cut*)
Adductor hallucis and lateral head of flexor hallucis brevis tendons (*cut*)
1st metatarsal bone
Plantar tarsometatarsal ligaments
Medial cuneiform bone
Tibialis anterior tendon (*cut*)
Plantar cuneonavicular ligament
Plantar cuboideonavicular ligament
Tuberosity of navicular bone
Plantar calcaneonavicular (spring) ligament
Tibialis posterior tendon
Flexor digitorum longus tendon (*cut*)
Sustentaculum tali
Flexor hallucis longus tendon (*cut*)
Posterior process of talus (medial and lateral tubercles)
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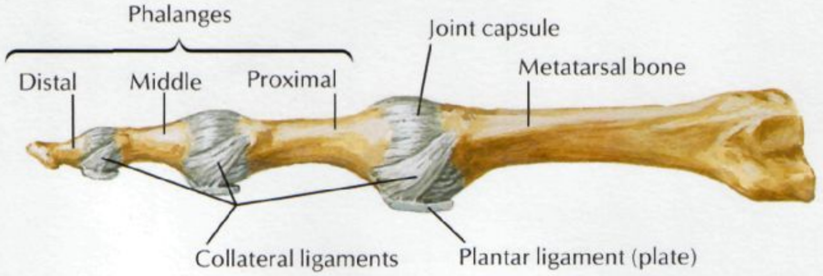
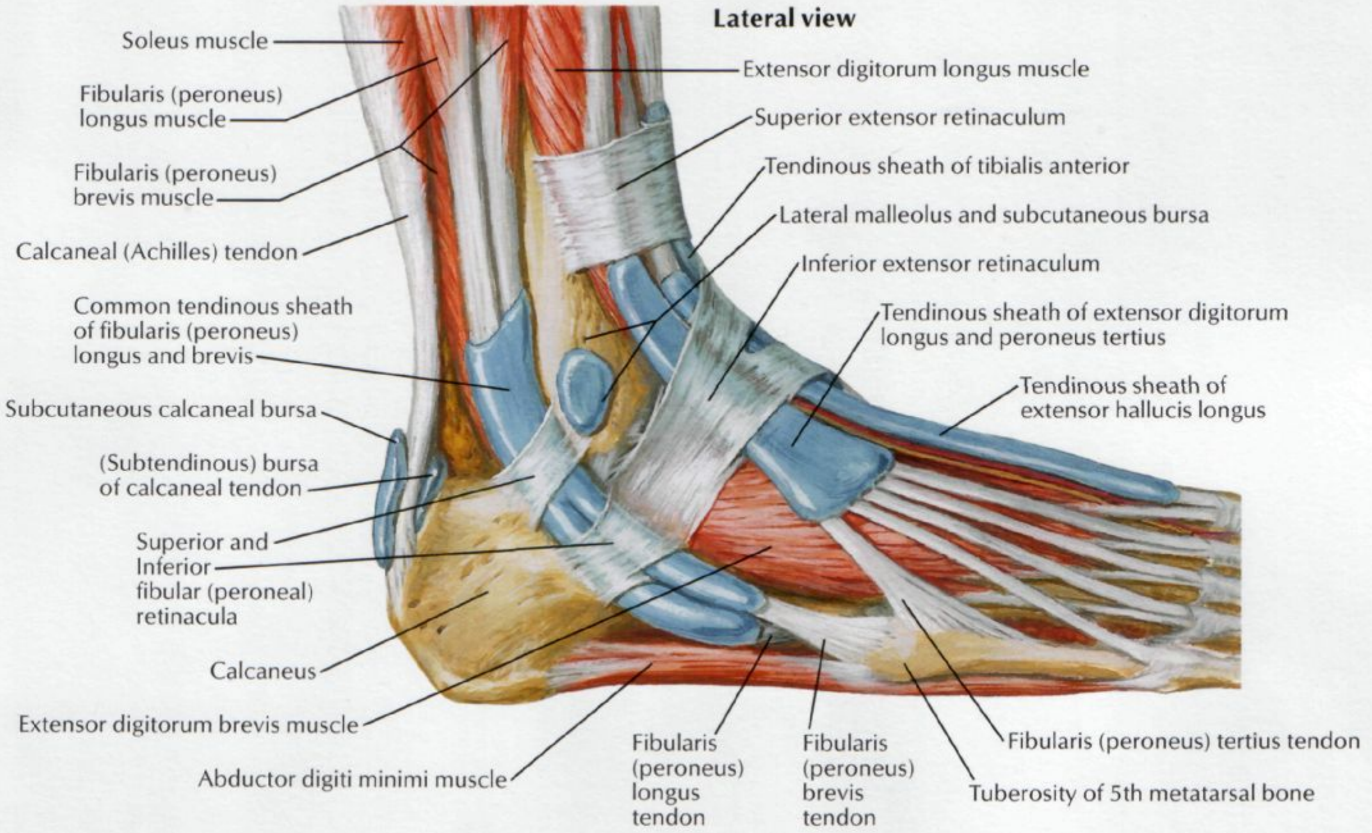


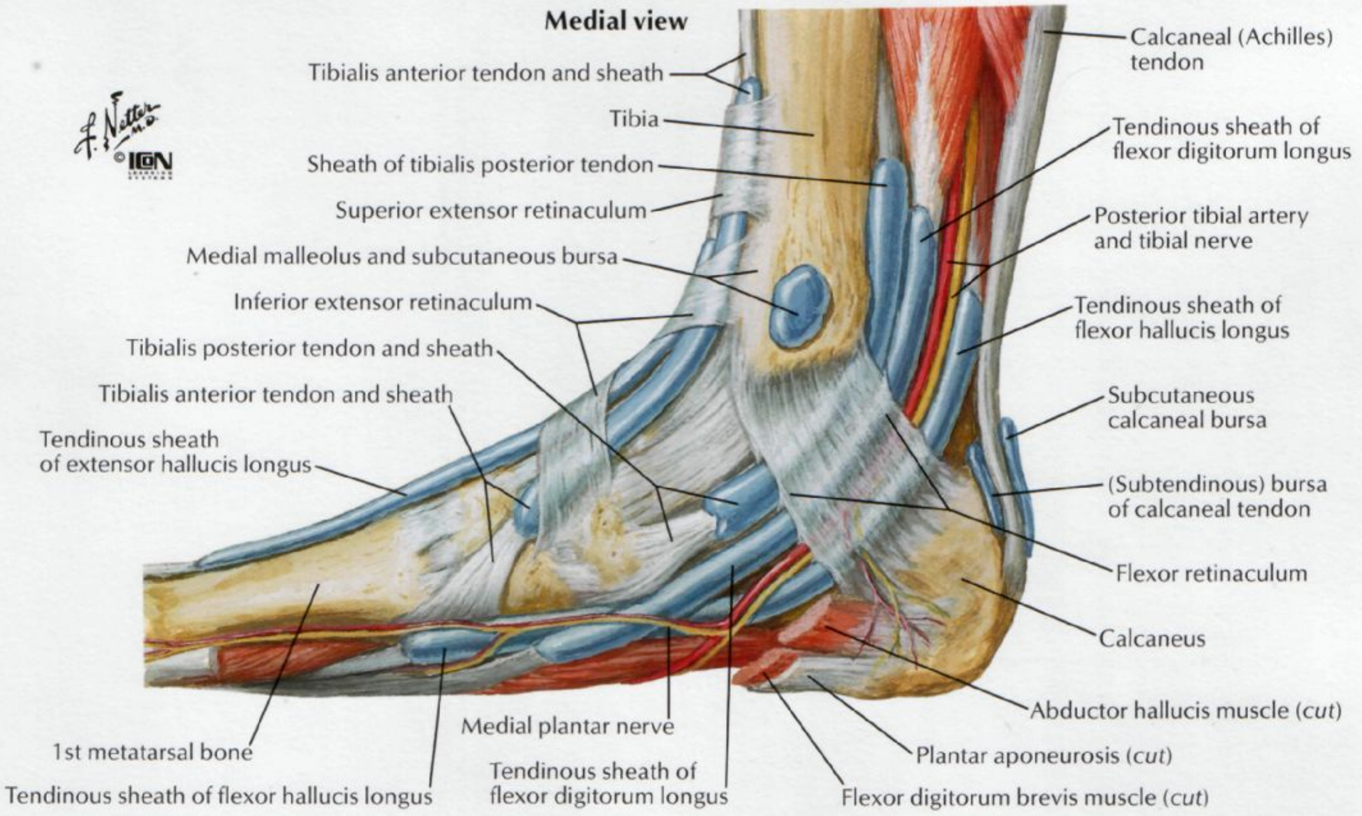
Capsules and ligaments of metatarsophalangeal and interphalangeal joints: lateral view

Tendon Sheaths of Ankle



Lateral view

Soleus muscle
Fibularis (peroneus) longus muscle
Fibularis (peroneus) brevis muscle
Calcaneal (Achilles) tendon
Common tendinous sheath of fibularis (peroneus) longus and brevis
Subcutaneous calcaneal bursa
(Subtendinous) bursa of calcaneal tendon
Superior and Inferior fibular (peroneal) retinacula
Calcaneus
Extensor digitorum brevis muscle
Abductor digiti minimi muscle
Extensor digitorum longus muscle
Superior extensor retinaculum
Tendinous sheath of tibialis anterior
Lateral malleolus and subcutaneous bursa
Inferior extensor retinaculum
Tendinous sheath of extensor digitorum longus and peroneus tertius
Tendinous sheath of extensor hallucis longus
Fibularis (peroneus) longus tendon
Fibularis (peroneus) brevis tendon
Fibularis (peroneus) tertius tendon
Tuberosity of 5th metatarsal bone



Medial view

Tibialis anterior tendon and sheath
Tibia
Sheath of tibialis posterior tendon
Superior extensor retinaculum
Medial malleolus and subcutaneous bursa
Inferior extensor retinaculum
Tibialis posterior tendon and sheath
Tibialis anterior tendon and sheath
Tendinous sheath of extensor hallucis longus
1st metatarsal bone
Tendinous sheath of flexor hallucis longus
Medial plantar nerve
Tendinous sheath of flexor digitorum longus
Calcaneal (Achilles) tendon
Tendinous sheath of flexor digitorum longus
Posterior tibial artery and tibial nerve
Tendinous sheath of flexor hallucis longus
Subcutaneous calcaneal bursa
(Subtendinous) bursa of calcaneal tendon
Flexor retinaculum
Calcaneus
Abductor hallucis muscle (cut)
Plantar aponeurosis (cut)
Flexor digitorum brevis muscle (cut)
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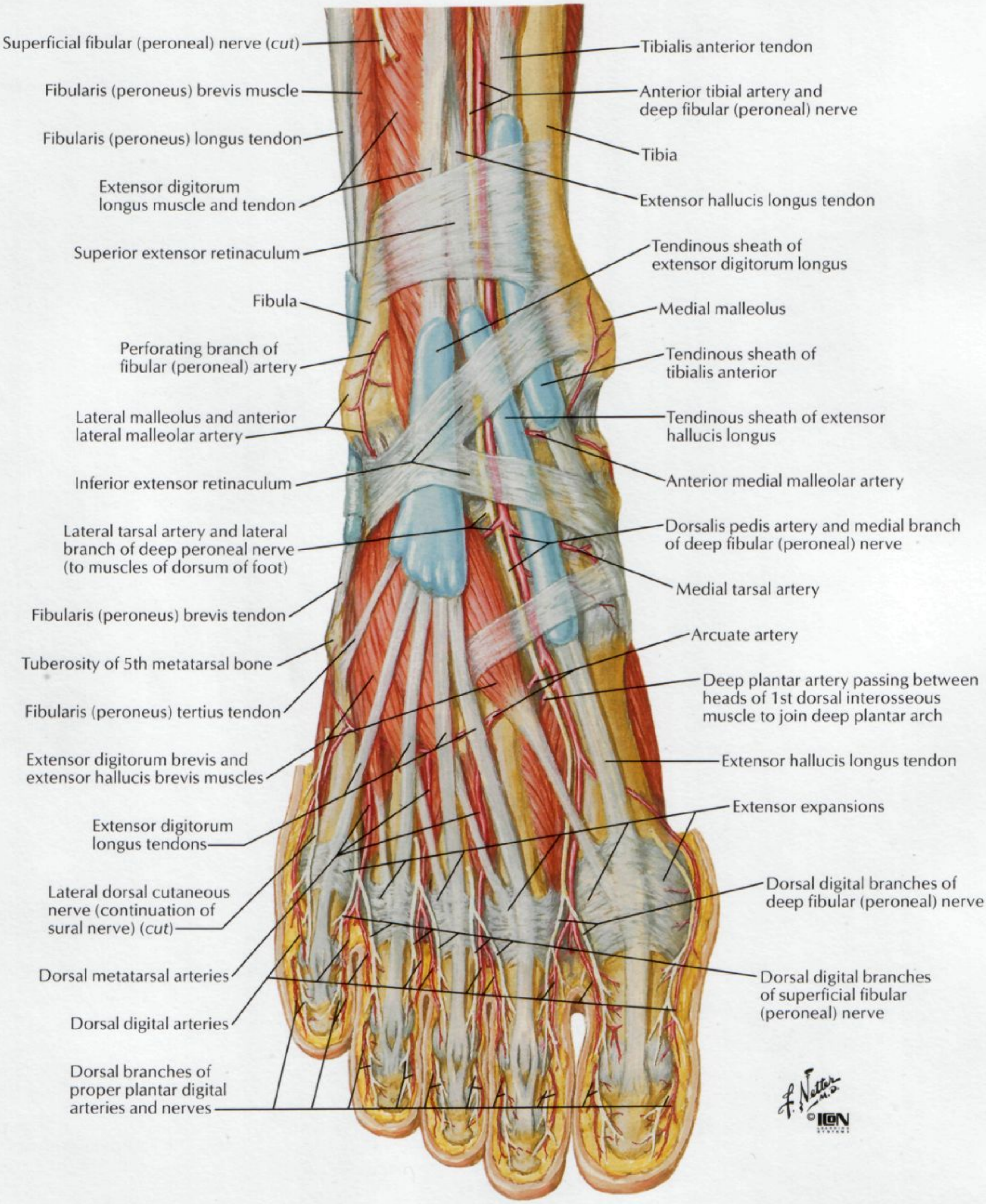
Muscles of Dorsum of Foot: Superficial Dissection


Superficial fibular (peroneal) nerve (*cut*)
Fibularis (peroneus) brevis muscle
Fibularis (peroneus) longus tendon
Extensor digitorum longus muscle and tendon
Superior extensor retinaculum
Fibula
Perforating branch of fibular (peroneal) artery
Lateral malleolus and anterior lateral malleolar artery
Inferior extensor retinaculum
Lateral tarsal artery and lateral branch of deep peroneal nerve (to muscles of dorsum of foot)
Fibularis (peroneus) brevis tendon
Tuberosity of 5th metatarsal bone
Fibularis (peroneus) tertius tendon
Extensor digitorum brevis and extensor hallucis brevis muscles
Extensor digitorum longus tendons
Lateral dorsal cutaneous nerve (continuation of sural nerve) (*cut*)
Dorsal metatarsal arteries
Dorsal digital arteries
Dorsal branches of proper plantar digital arteries and nerves
Tibialis anterior tendon
Anterior tibial artery and deep fibular (peroneal) nerve
Tibia
Extensor hallucis longus tendon
Tendinous sheath of extensor digitorum longus
Medial malleolus
Tendinous sheath of tibialis anterior
Tendinous sheath of extensor hallucis longus
Anterior medial malleolar artery
Dorsalis pedis artery and medial branch of deep fibular (peroneal) nerve
Medial tarsal artery
Arcuate artery
Deep plantar artery passing between heads of 1st dorsal interosseous muscle to join deep plantar arch
Extensor hallucis longus tendon
Extensor expansions
Dorsal digital branches of deep fibular (peroneal) nerve
Dorsal digital branches of superficial fibular (peroneal) nerve
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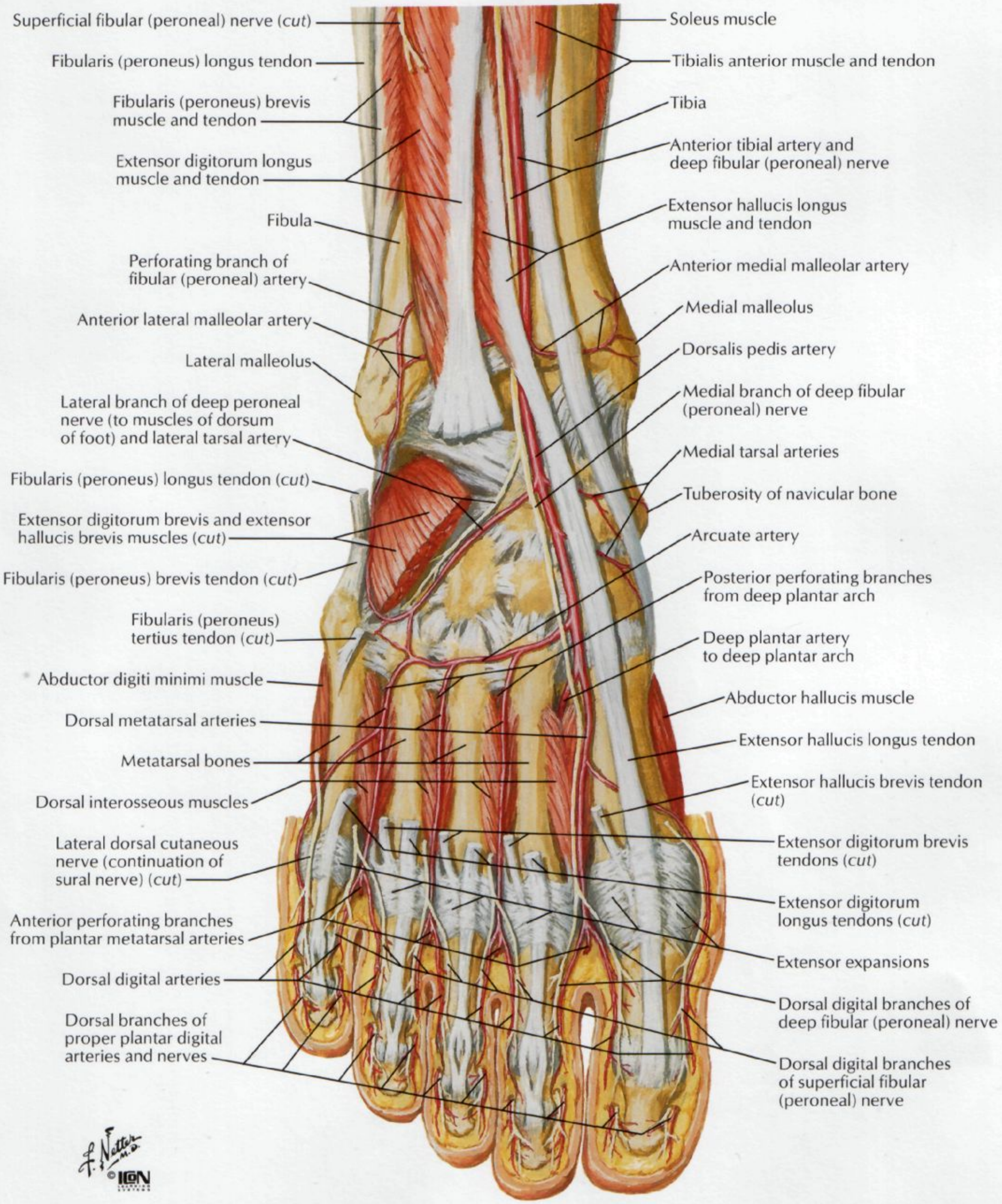
Dorsum of Foot: Deep Dissection



Superficial fibular (peroneal) nerve (*cut*)
Fibularis (peroneus) longus tendon
Fibularis (peroneus) brevis muscle and tendon
Extensor digitorum longus muscle and tendon
Fibula
Perforating branch of fibular (peroneal) artery
Anterior lateral malleolar artery
Lateral malleolus
Lateral branch of deep peroneal nerve (to muscles of dorsum of foot) and lateral tarsal artery
Fibularis (peroneus) longus tendon (*cut*)
Extensor digitorum brevis and extensor hallucis brevis muscles (*cut*)
Fibularis (peroneus) brevis tendon (*cut*)
Fibularis (peroneus) tertius tendon (*cut*)
Abductor digiti minimi muscle
Dorsal metatarsal arteries
Metatarsal bones
Dorsal interosseous muscles
Lateral dorsal cutaneous nerve (continuation of sural nerve) (*cut*)
Anterior perforating branches from plantar metatarsal arteries
Dorsal digital arteries
Dorsal branches of proper plantar digital arteries and nerves
Soleus muscle
Tibialis anterior muscle and tendon
Tibia
Anterior tibial artery and deep fibular (peroneal) nerve
Extensor hallucis longus muscle and tendon
Anterior medial malleolar artery
Medial malleolus
Dorsalis pedis artery
Medial branch of deep fibular (peroneal) nerve
Medial tarsal arteries
Tuberosity of navicular bone
Arcuate artery
Posterior perforating branches from deep plantar arch
Deep plantar artery to deep plantar arch
Abductor hallucis muscle
Extensor hallucis longus tendon
Extensor hallucis brevis tendon (*cut*)
Extensor digitorum brevis tendons (*cut*)
Extensor digitorum longus tendons (*cut*)
Extensor expansions
Dorsal digital branches of deep fibular (peroneal) nerve
Dorsal digital branches of superficial fibular (peroneal) nerve
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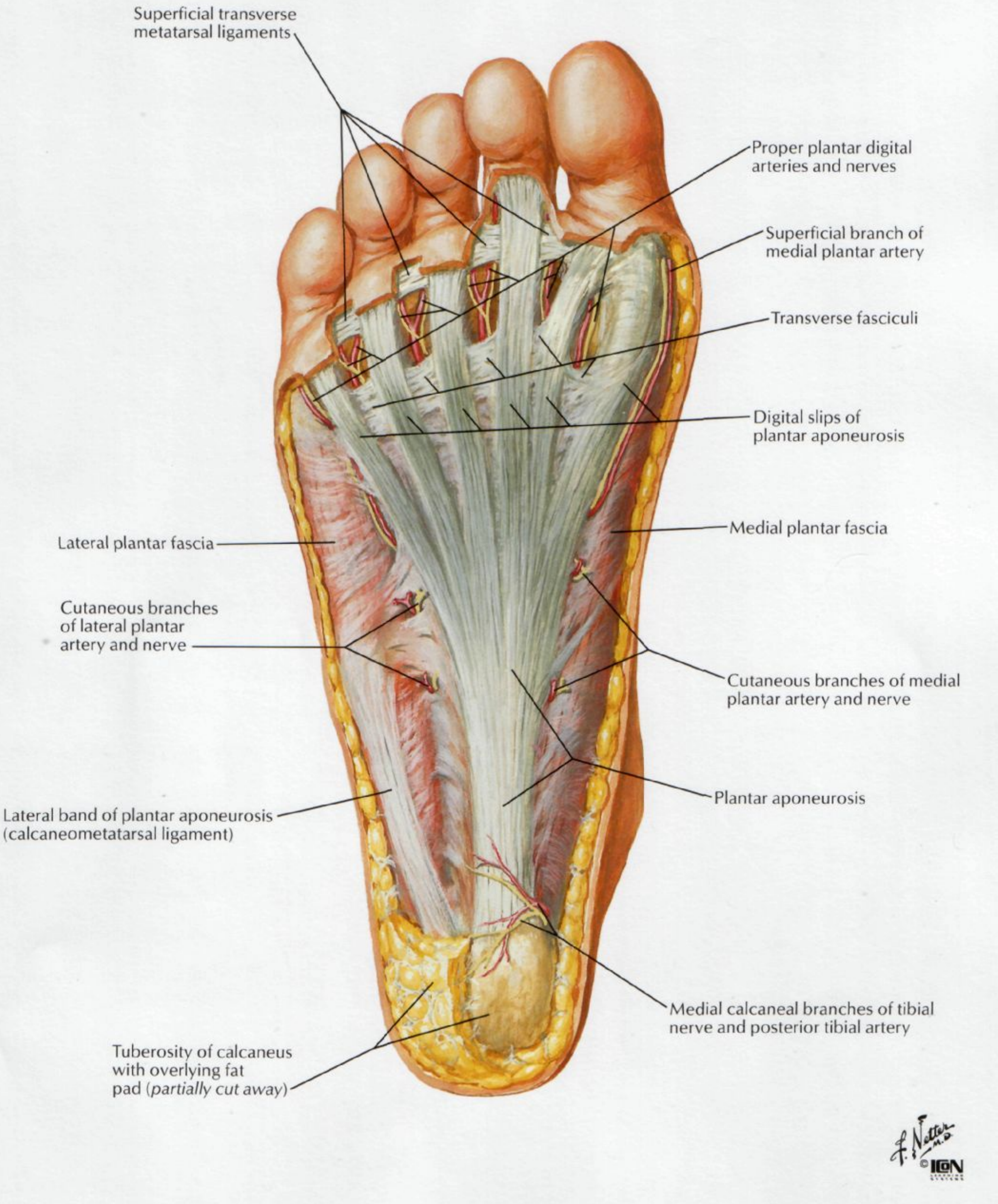
Sole of Foot: Superficial Dissection


Superficial transverse metatarsal ligaments
Proper plantar digital arteries and nerves
Superficial branch of medial plantar artery
Transverse fasciculi
Digital slips of plantar aponeurosis
Lateral plantar fascia
Medial plantar fascia
Cutaneous branches of lateral plantar artery and nerve
Cutaneous branches of medial plantar artery and nerve
Plantar aponeurosis
Lateral band of plantar aponeurosis (calcaneometatarsal ligament)
Medial calcaneal branches of tibial nerve and posterior tibial artery
Tuberosity of calcaneus with overlying fat pad (*partially cut away*)
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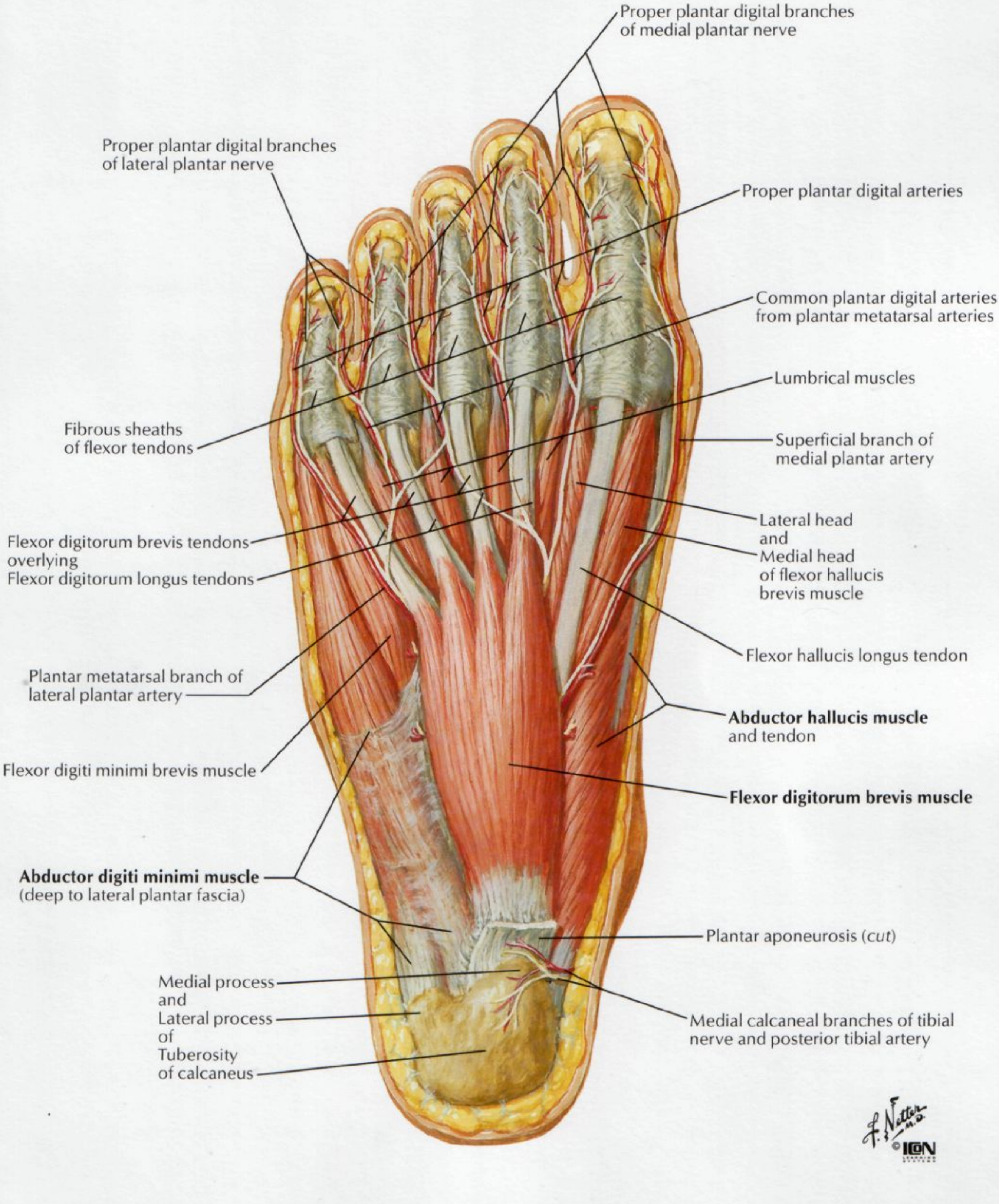
Muscles of Sole of Foot: First Layer


Proper plantar digital branches of medial plantar nerve
Proper plantar digital branches of lateral plantar nerve
Proper plantar digital arteries
Common plantar digital arteries from plantar metatarsal arteries
Lumbrical muscles
Fibrous sheaths of flexor tendons
Superficial branch of medial plantar artery
Lateral head and Medial head of flexor hallucis brevis muscle
Flexor digitorum brevis tendons overlying Flexor digitorum longus tendons
Flexor hallucis longus tendon
Plantar metatarsal branch of lateral plantar artery
Abductor hallucis muscle and tendon
Flexor digiti minimi brevis muscle
Flexor digitorum brevis muscle
Abductor digiti minimi muscle (deep to lateral plantar fascia)
Plantar aponeurosis (*cut*)
Medial process and Lateral process of Tuberosity of calcaneus
Medial calcaneal branches of tibial nerve and posterior tibial artery
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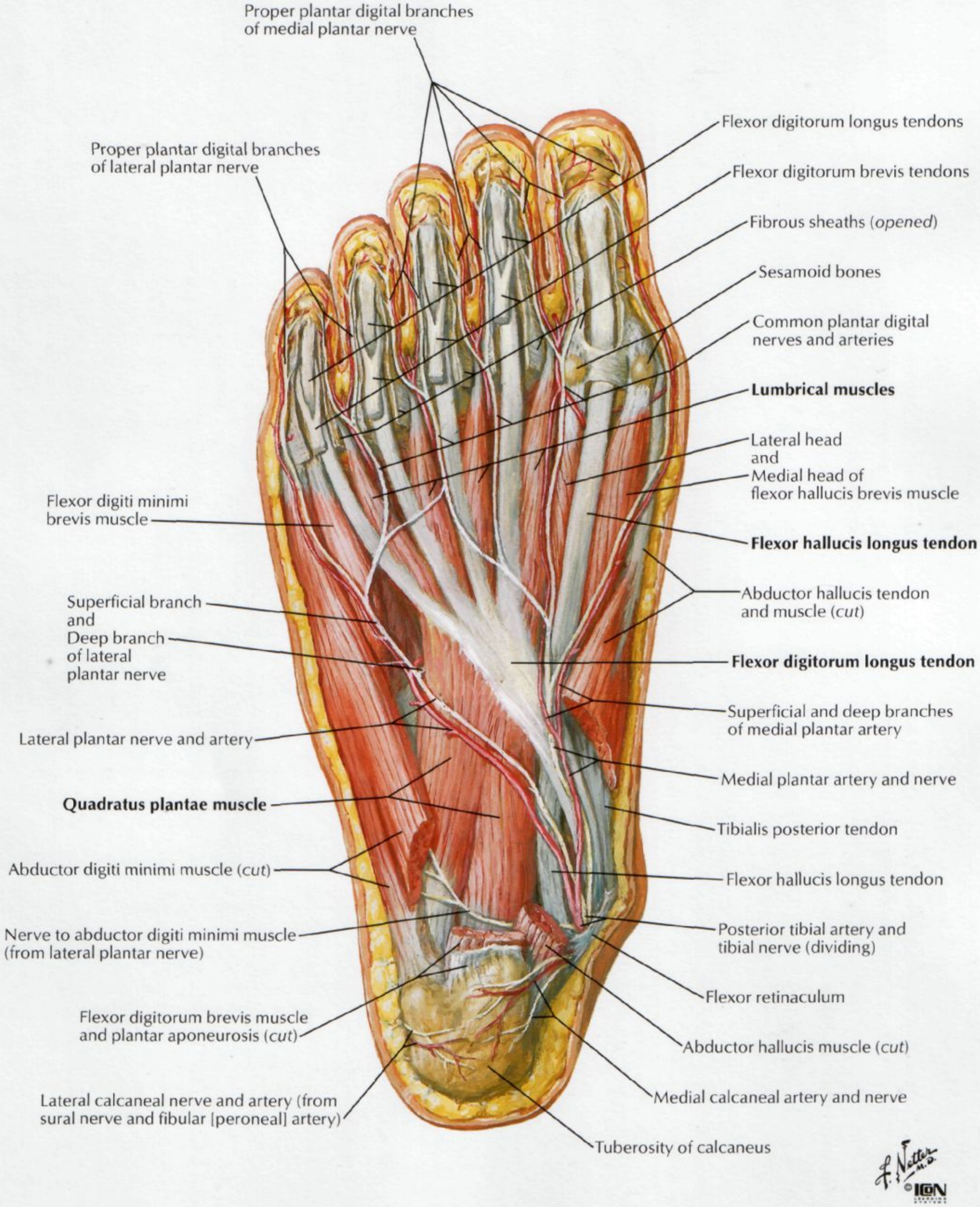
Muscles of Sole of Foot: Second Layer


Proper plantar digital branches of medial plantar nerve
Proper plantar digital branches of lateral plantar nerve
Flexor digitorum longus tendons
Flexor digitorum brevis tendons
Fibrous sheaths (*opened*)
Sesamoid bones
Common plantar digital nerves and arteries
Lumbrical muscles
Lateral head and Medial head of flexor hallucis brevis muscle
Flexor digiti minimi brevis muscle
Flexor hallucis longus tendon
Abductor hallucis tendon and muscle (*cut*)
Superficial branch and Deep branch of lateral plantar nerve
Flexor digitorum longus tendon
Superficial and deep branches of medial plantar artery
Lateral plantar nerve and artery
Medial plantar artery and nerve
Quadratus plantae muscle
Tibialis posterior tendon
Abductor digiti minimi muscle (*cut*)
Flexor hallucis longus tendon
Nerve to abductor digiti minimi muscle (from lateral plantar nerve)
Posterior tibial artery and tibial nerve (dividing)
Flexor retinaculum
Flexor digitorum brevis muscle and plantar aponeurosis (*cut*)
Abductor hallucis muscle (*cut*)
Medial calcaneal artery and nerve
Lateral calcaneal nerve and artery (from sural nerve and fibular [peroneal] artery)
Tuberosity of calcaneus
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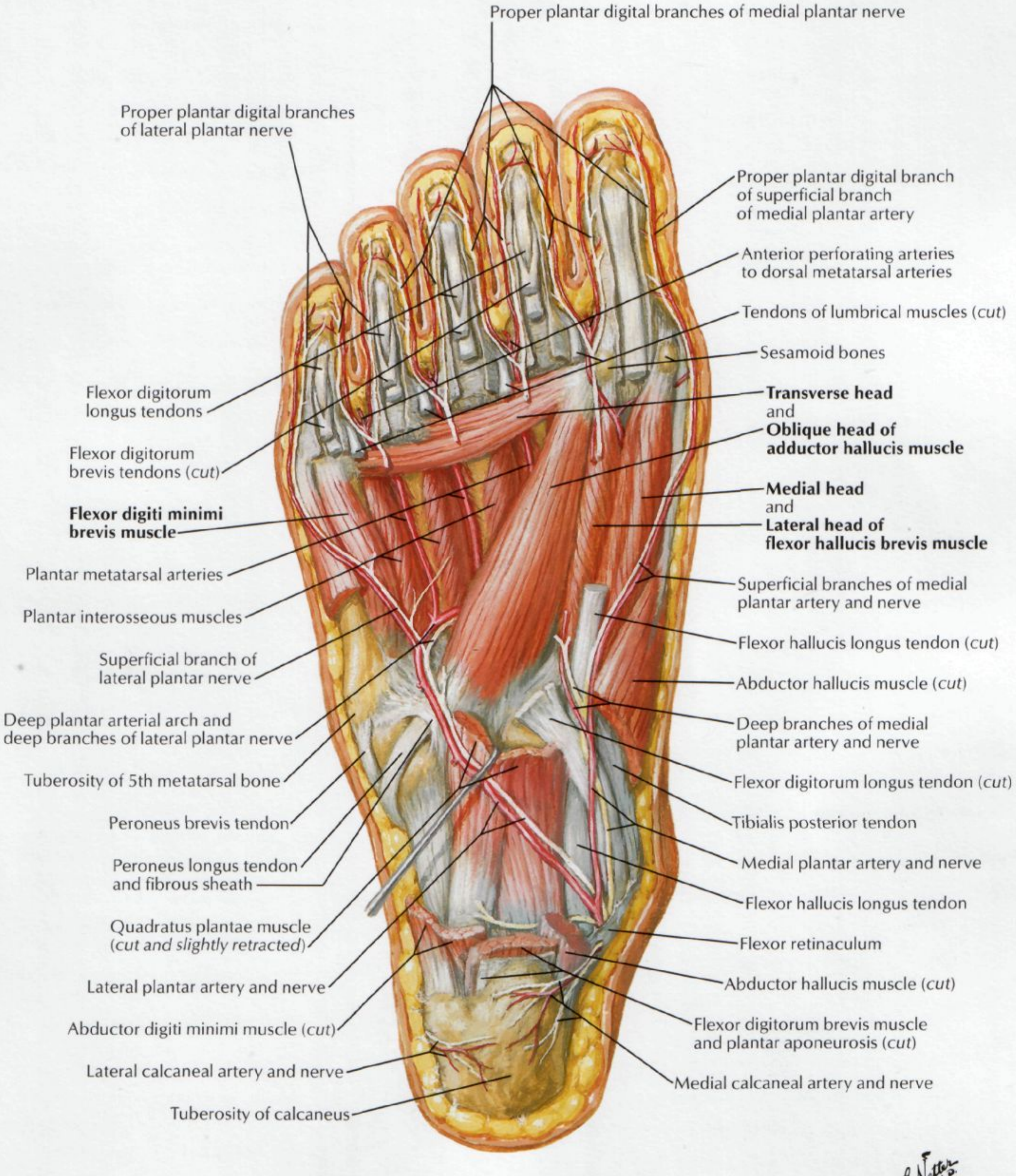
Muscles of Sole of Foot: Third Layer


Proper plantar digital branches of medial plantar nerve
Proper plantar digital branches of lateral plantar nerve
Proper plantar digital branch of superficial branch of medial plantar artery
Anterior perforating arteries to dorsal metatarsal arteries
Tendons of lumbrical muscles (*cut*)
Sesamoid bones
Flexor digitorum longus tendons
Transverse head and **Oblique head of adductor hallucis muscle**
Flexor digitorum brevis tendons (*cut*)
Flexor digiti minimi brevis muscle
Medial head and **Lateral head of flexor hallucis brevis muscle**
Plantar metatarsal arteries
Superficial branches of medial plantar artery and nerve
Plantar interosseous muscles
Flexor hallucis longus tendon (*cut*)
Superficial branch of lateral plantar nerve
Abductor hallucis muscle (*cut*)
Deep plantar arterial arch and deep branches of lateral plantar nerve
Deep branches of medial plantar artery and nerve
Tuberosity of 5th metatarsal bone
Flexor digitorum longus tendon (*cut*)
Peroneus brevis tendon
Tibialis posterior tendon
Peroneus longus tendon and fibrous sheath
Medial plantar artery and nerve
Flexor hallucis longus tendon
Quadratus plantae muscle (*cut and slightly retracted*)
Flexor retinaculum
Lateral plantar artery and nerve
Abductor hallucis muscle (*cut*)
Abductor digiti minimi muscle (*cut*)
Flexor digitorum brevis muscle and plantar aponeurosis (*cut*)
Lateral calcaneal artery and nerve
Medial calcaneal artery and nerve
Tuberosity of calcaneus
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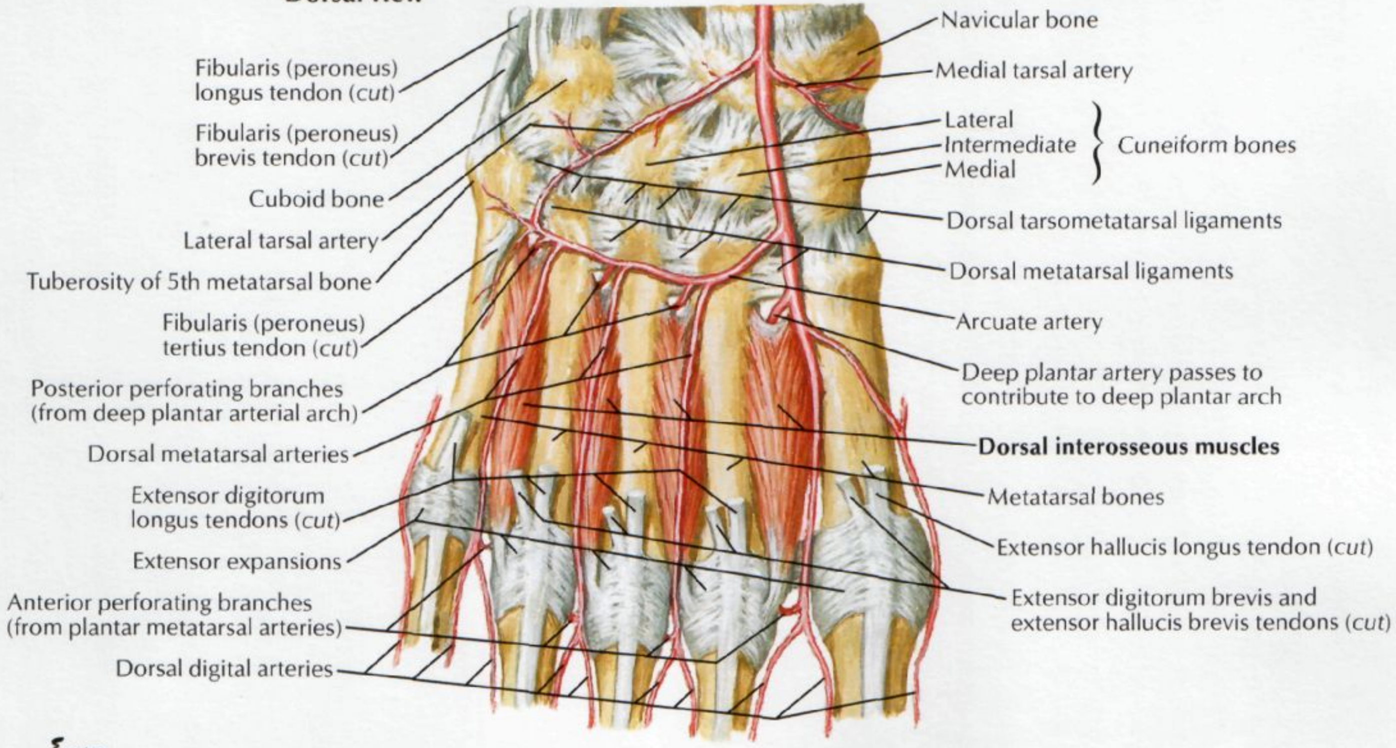
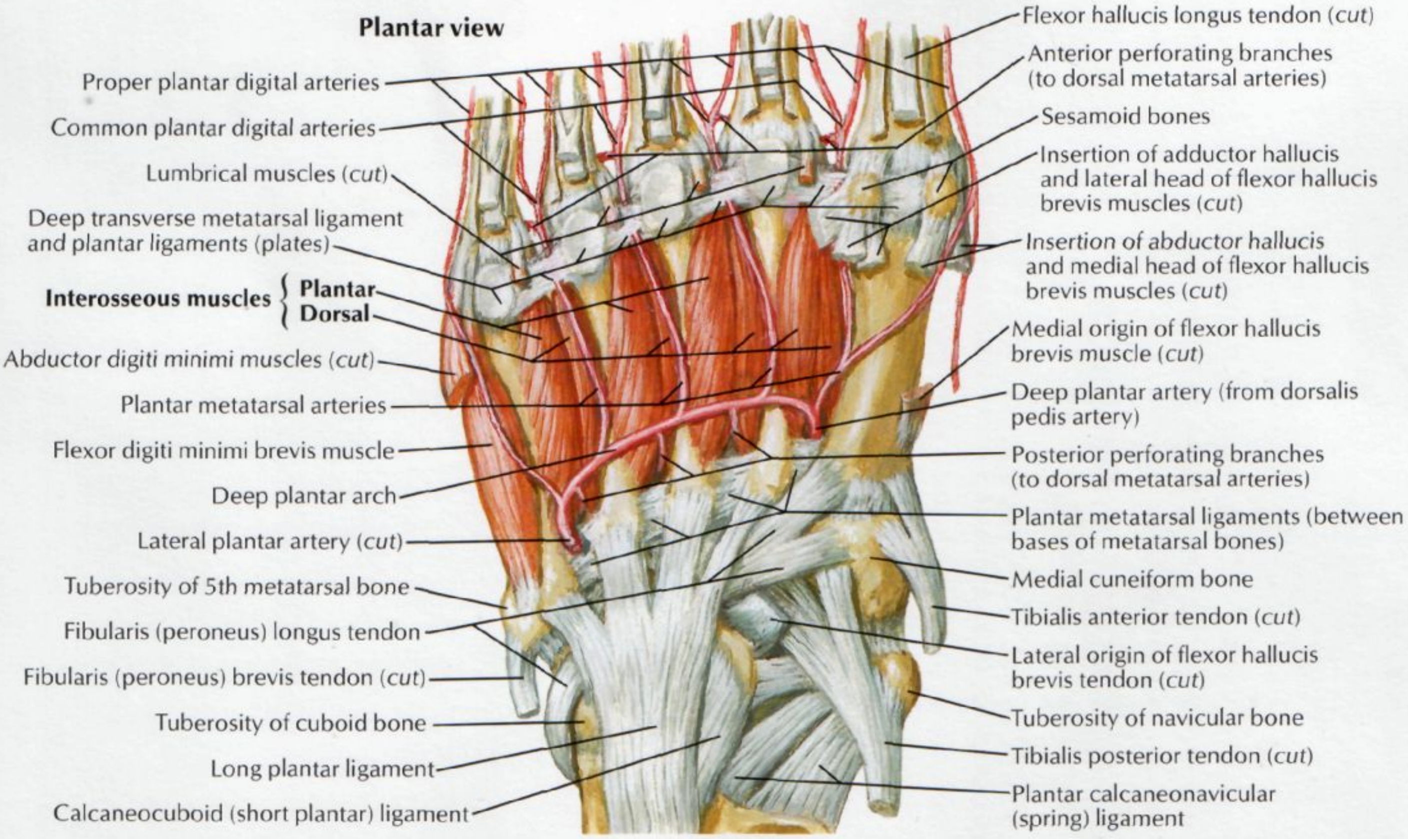
Interosseous Muscles and Deep Arteries of Foot



Dorsal view

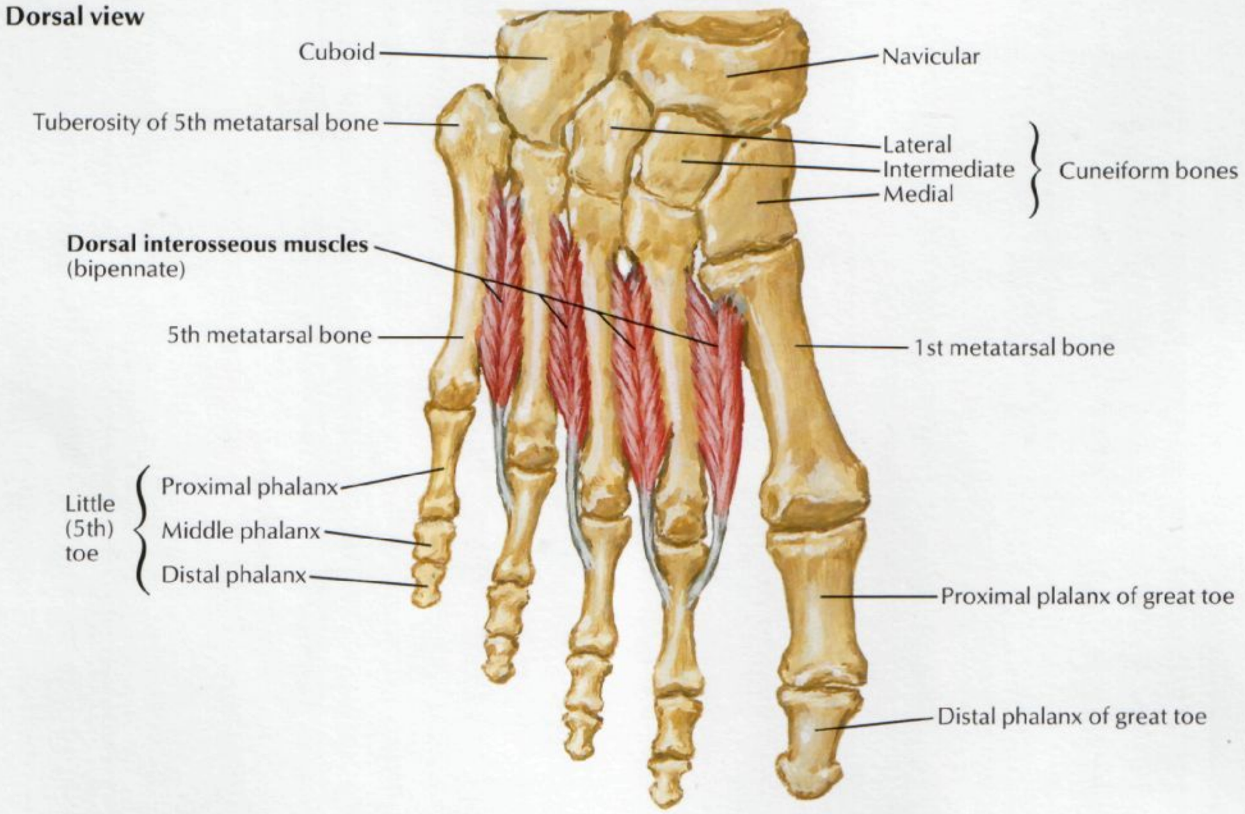
Navicular bone
Medial tarsal artery
Lateral
Intermediate
Medial
Cuneiform bones
Dorsal tarsometatarsal ligaments
Dorsal metatarsal ligaments
Arcuate artery
Deep plantar artery passes to contribute to deep plantar arch
Dorsal interosseous muscles
Metatarsal bones
Extensor hallucis longus tendon (*cut*)
Extensor digitorum brevis and extensor hallucis brevis tendons (*cut*)
Fibularis (peroneus) longus tendon (*cut*)
Fibularis (peroneus) brevis tendon (*cut*)
Cuboid bone
Lateral tarsal artery
Tuberosity of 5th metatarsal bone
Fibularis (peroneus) tertius tendon (*cut*)
Posterior perforating branches (from deep plantar arterial arch)
Dorsal metatarsal arteries
Extensor digitorum longus tendons (*cut*)
Extensor expansions
Anterior perforating branches (from plantar metatarsal arteries)
Dorsal digital arteries

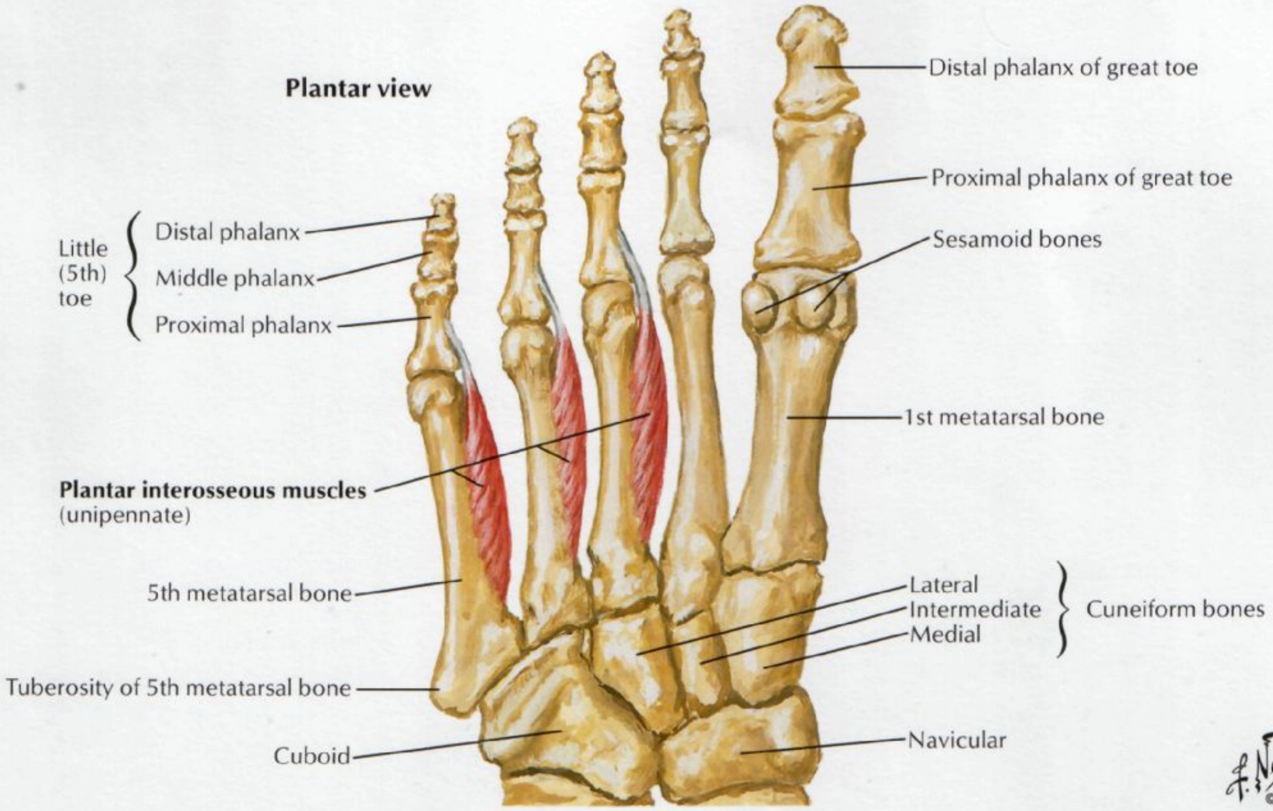


Plantar view

Proper plantar digital arteries
Common plantar digital arteries
Lumbrical muscles (*cut*)
Deep transverse metatarsal ligament and plantar ligaments (plates)
Interosseous muscles **Plantar**
Dorsal
Abductor digiti minimi muscles (cut)
Plantar metatarsal arteries
Flexor digiti minimi brevis muscle
Deep plantar arch
Lateral plantar artery (*cut*)
Tuberosity of 5th metatarsal bone
Fibularis (peroneus) longus tendon
Fibularis (peroneus) brevis tendon (*cut*)
Tuberosity of cuboid bone
Long plantar ligament
Calcaneocuboid (short plantar) ligament
Flexor hallucis longus tendon (*cut*)
Anterior perforating branches (to dorsal metatarsal arteries)
Sesamoid bones
Insertion of adductor hallucis and lateral head of flexor hallucis brevis muscles (*cut*)
Insertion of abductor hallucis and medial head of flexor hallucis brevis muscles (*cut*)
Medial origin of flexor hallucis brevis muscle (*cut*)
Deep plantar artery (from dorsalis pedis artery)
Posterior perforating branches (to dorsal metatarsal arteries)
Plantar metatarsal ligaments (between bases of metatarsal bones)
Medial cuneiform bone
Tibialis anterior tendon (*cut*)
Lateral origin of flexor hallucis brevis tendon (*cut*)
Tuberosity of navicular bone
Tibialis posterior tendon (*cut*)
Plantar calcaneonavicular (spring) ligament

Interosseous Muscles of Foot





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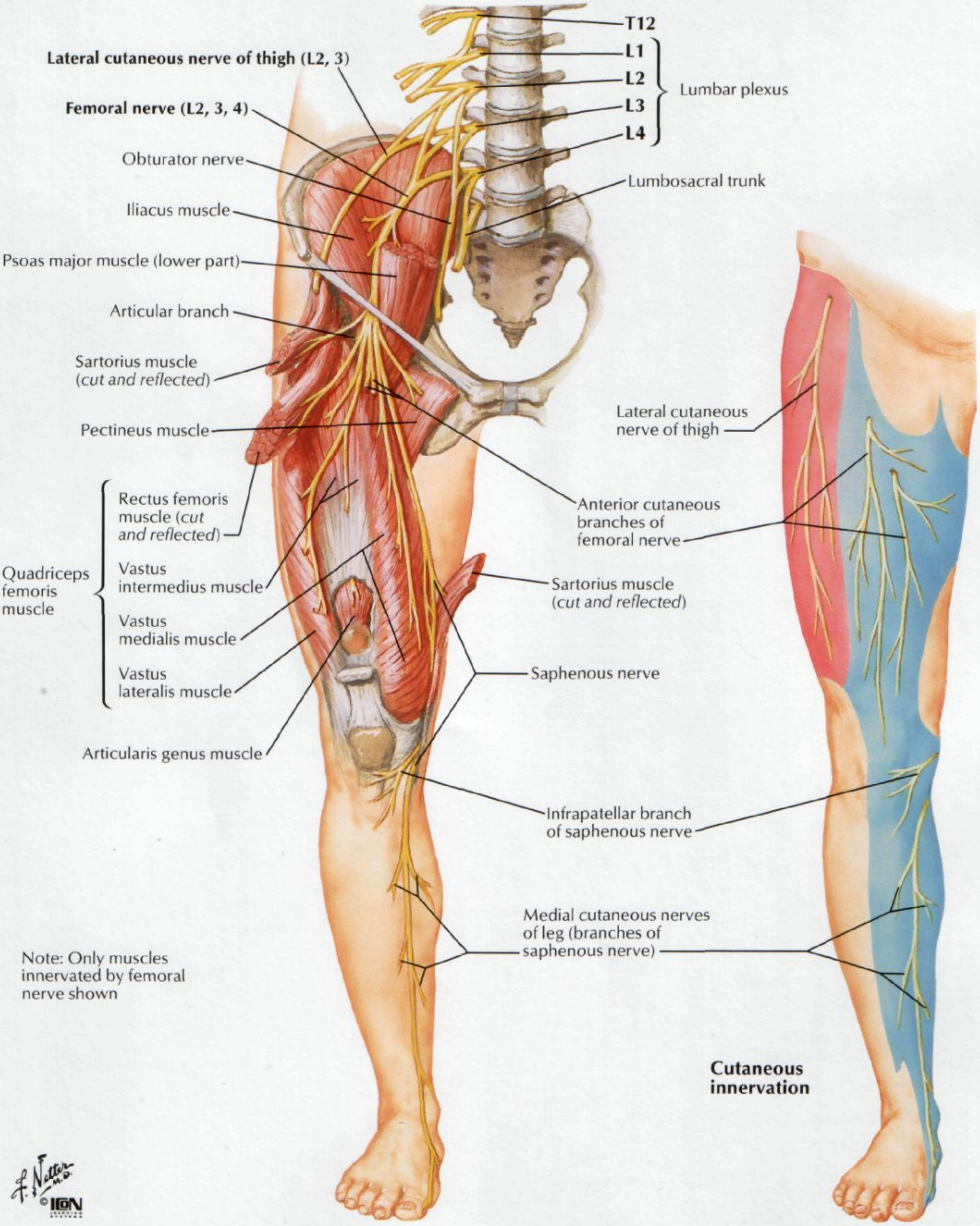
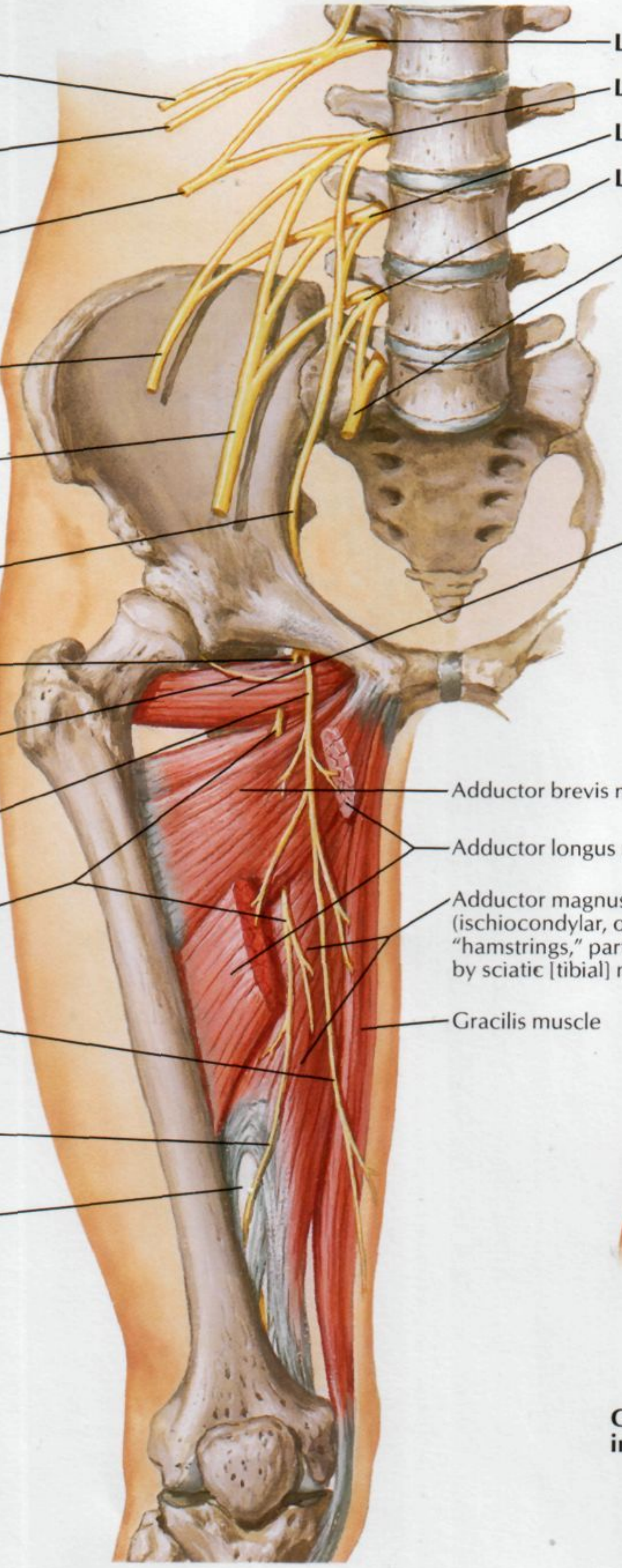
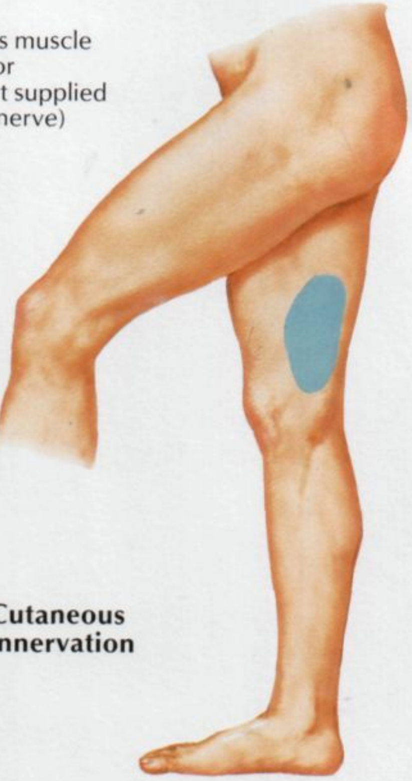
Femoral Nerve and Lateral Cutaneous Nerve of Thigh


T12
L1
L2
L3
L4
Lumbar plexus
Lateral cutaneous nerve of thigh (L2, 3)
Femoral nerve (L2, 3, 4)
Obturator nerve
Lumbosacral trunk
Iliacus muscle
Psoas major muscle (lower part)
Articular branch
Sartorius muscle (*cut and reflected*)
Pectineus muscle
Lateral cutaneous nerve of thigh
Quadriceps femoris muscle
Rectus femoris muscle (*cut and reflected*)
Anterior cutaneous branches of femoral nerve
Vastus intermedius muscle
Sartorius muscle (*cut and reflected*)
Vastus medialis muscle
Vastus lateralis muscle
Saphenous nerve
Articularis genus muscle
Infrapatellar branch of saphenous nerve
Medial cutaneous nerves of leg (branches of saphenous nerve)
Note: Only muscles innervated by femoral nerve shown
Cutaneous innervation

Obturator Nerve

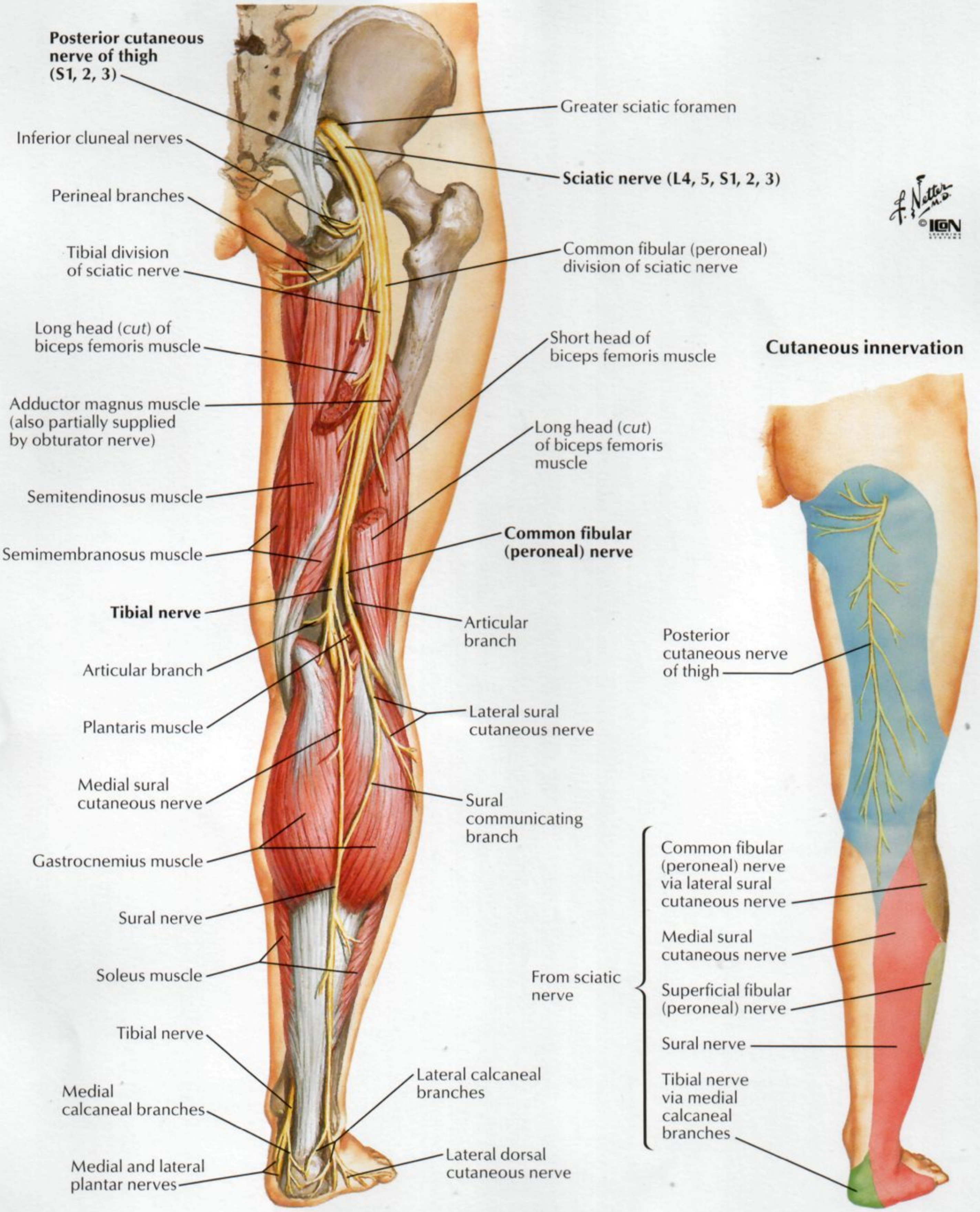


Note: Only muscles innervated by obturator nerve shown

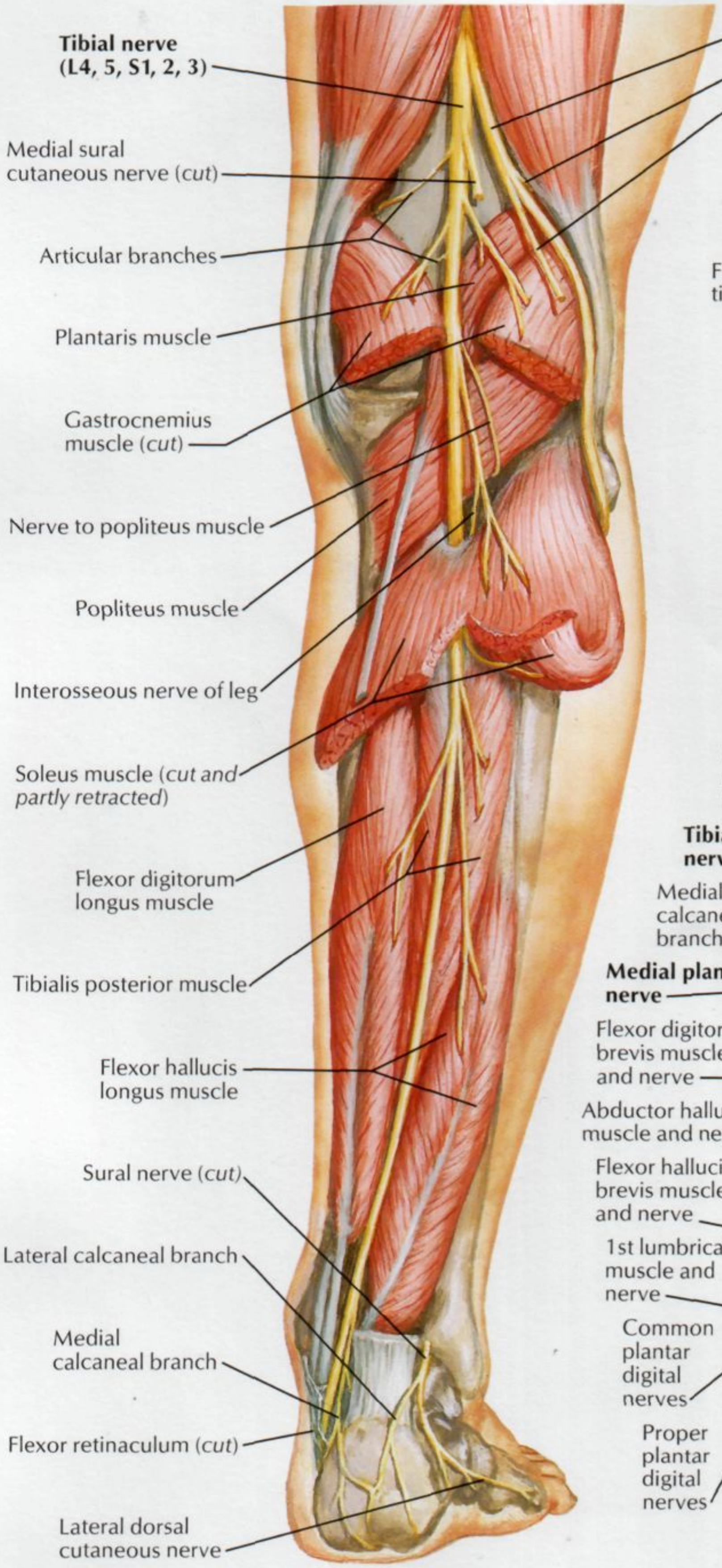


Cutaneous innervation

Sciatic Nerve and Posterior Cutaneous Nerve of Thigh


Posterior cutaneous nerve of thigh (S1, 2, 3)
Inferior cluneal nerves
Perineal branches
Tibial division of sciatic nerve
Long head (*cut*) of biceps femoris muscle
Adductor magnus muscle (also partially supplied by obturator nerve)
Semitendinosus muscle
Semimembranosus muscle
Tibial nerve
Articular branch
Plantaris muscle
Medial sural cutaneous nerve
Gastrocnemius muscle
Sural nerve
Soleus muscle
Tibial nerve
Medial calcaneal branches
Medial and lateral plantar nerves
Greater sciatic foramen
Sciatic nerve (L4, 5, S1, 2, 3)
Common fibular (peroneal) division of sciatic nerve
Short head of biceps femoris muscle
Long head (*cut*) of biceps femoris muscle
Common fibular (peroneal) nerve
Articular branch
Lateral sural cutaneous nerve
Sural communicating branch
Lateral calcaneal branches
Lateral dorsal cutaneous nerve
Cutaneous innervation
Posterior cutaneous nerve of thigh
From sciatic nerve
Common fibular (peroneal) nerve via lateral sural cutaneous nerve
Medial sural cutaneous nerve
Superficial fibular (peroneal) nerve
Sural nerve
Tibial nerve via medial calcaneal branches

Tibial Nerve


Tibial nerve (L4, 5, S1, 2, 3)
Medial sural cutaneous nerve (*cut*)
Articular branches
Plantaris muscle
Gastrocnemius muscle (*cut*)
Nerve to popliteus muscle
Popliteus muscle
Interosseous nerve of leg
Soleus muscle (*cut and partly retracted*)
Flexor digitorum longus muscle
Tibialis posterior muscle
Flexor hallucis longus muscle
Sural nerve (*cut*)
Lateral calcaneal branch
Medial calcaneal branch
Flexor retinaculum (*cut*)
Lateral dorsal cutaneous nerve
Common fibular (peroneal) nerve
Articular branch
Lateral sural cutaneous nerve (*cut*)

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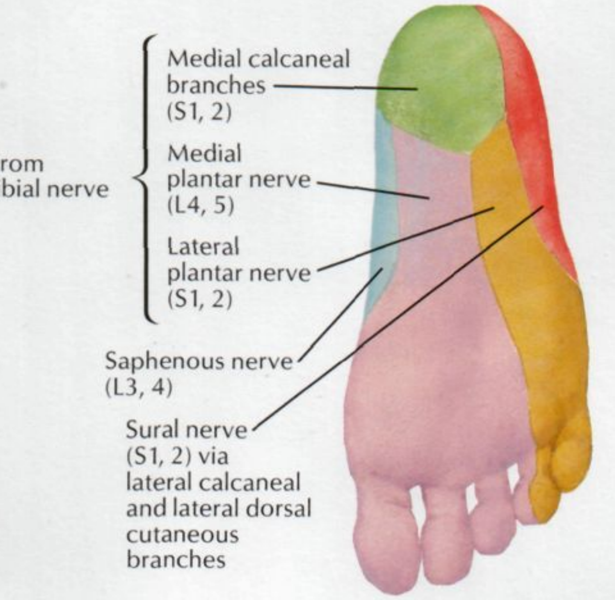
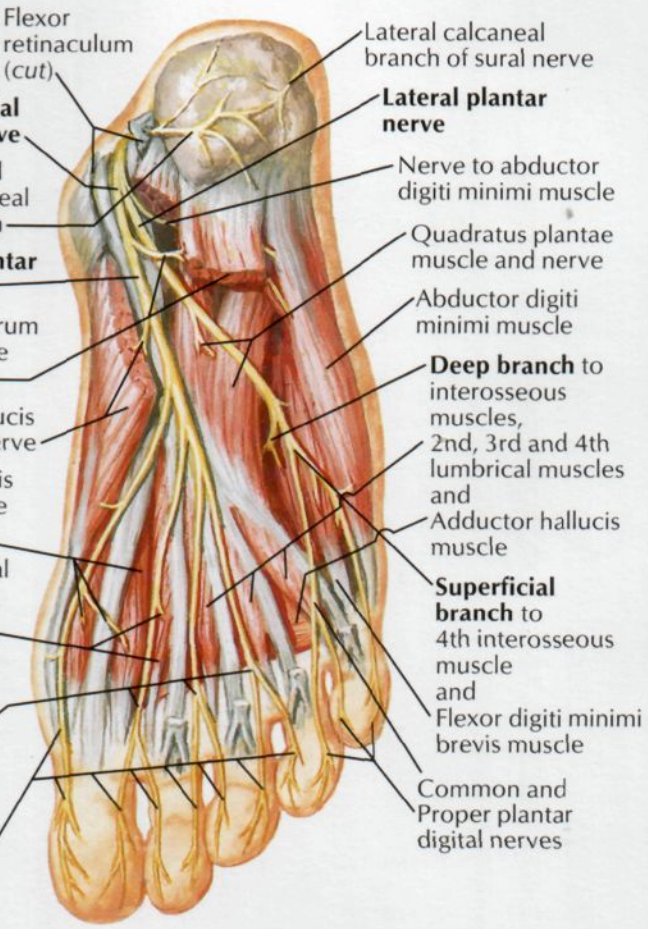

From tibial nerve
Medial calcaneal branches (S1, 2)
Medial plantar nerve (L4, 5)
Lateral plantar nerve (S1, 2)
Saphenous nerve (L3, 4)
Sural nerve (S1, 2) via lateral calcaneal and lateral dorsal cutaneous branches

Cutaneous innervation of sole


Flexor retinaculum (*cut*)
Tibial nerve
Medial calcaneal branch
Medial plantar nerve
Flexor digitorum brevis muscle and nerve
Abductor hallucis muscle and nerve
Flexor hallucis brevis muscle and nerve
1st lumbrical muscle and nerve
Common plantar digital nerves
Proper plantar digital nerves
Lateral calcaneal branch of sural nerve
Lateral plantar nerve
Nerve to abductor digiti minimi muscle
Quadratus plantae muscle and nerve
Abductor digiti minimi muscle
Deep branch to interosseous muscles, 2nd, 3rd and 4th lumbrical muscles and Adductor hallucis muscle
Superficial branch to 4th interosseous muscle and Flexor digiti minimi brevis muscle
Common and Proper plantar digital nerves

Note: Articular branches not shown

Common Fibular (Peroneal) Nerve

SEE ALSO PLATES 502, 503

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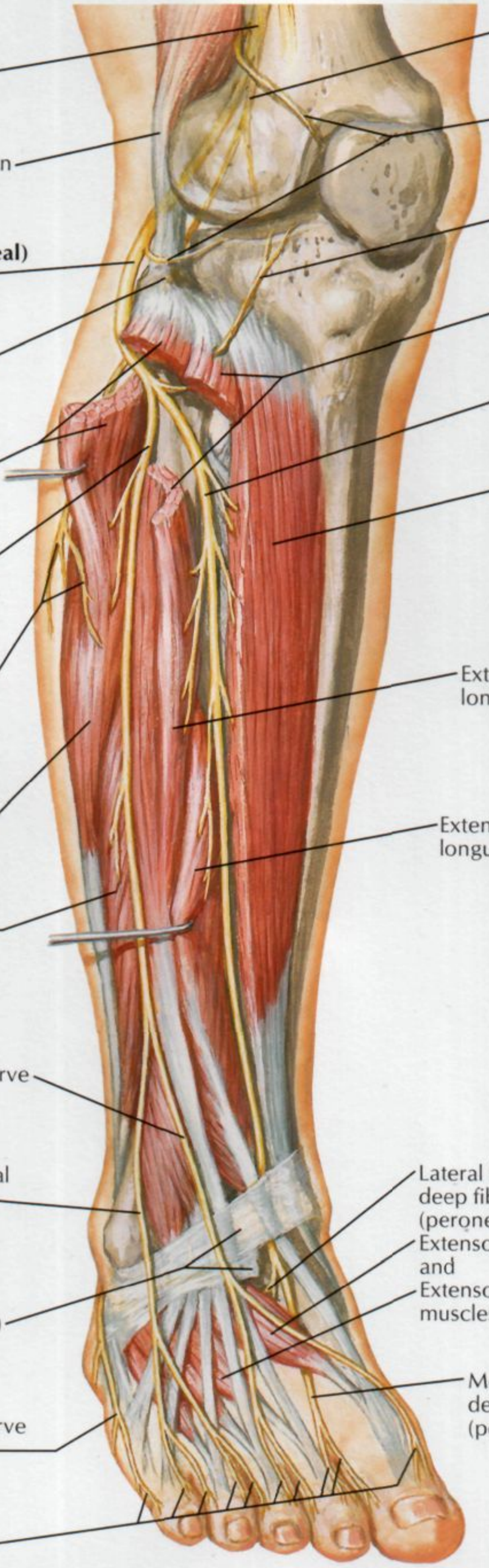
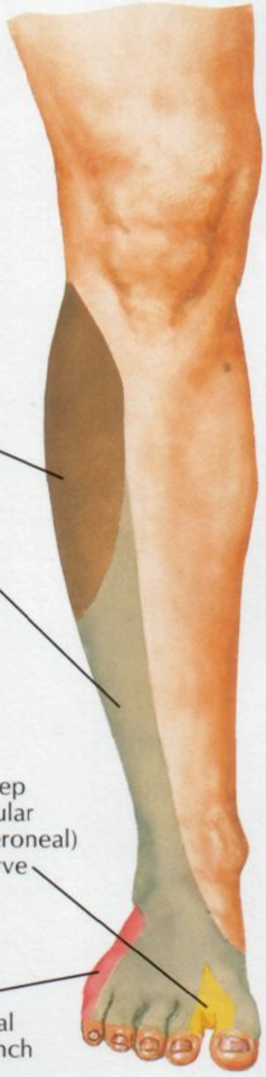
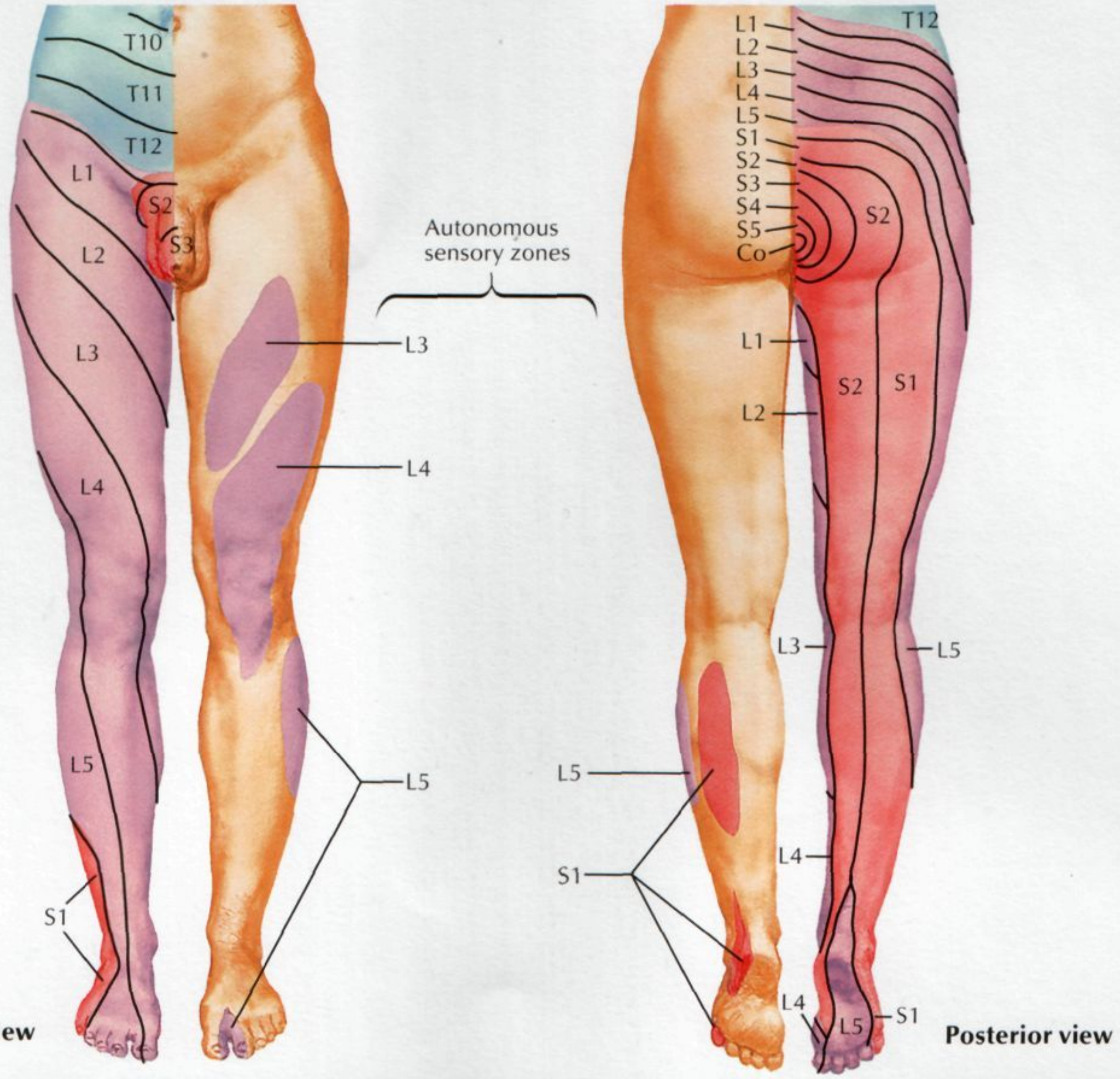

Common fibular (peroneal) nerve (*phantom*)
Biceps femoris tendon
Common fibular (peroneal) nerve (L4, 5, S1, 2)
Head of fibula
Fibularis (peroneus) longus muscle (*cut*)
Superficial fibular (peroneal) nerve
Branches of lateral sural cutaneous nerve
Fibularis (peroneus) longus muscle
Fibularis (peroneus) brevis muscle
Medial dorsal cutaneous nerve
Intermediate dorsal cutaneous nerve
Inferior extensor retinaculum (*partially cut*)
Lateral dorsal cutaneous nerve (branch of sural nerve)
Dorsal digital nerves
Lateral sural cutaneous nerve (*phantom*)
Articular branches
Recurrent articular nerve
Extensor digitorum longus muscle (*cut*)
Deep fibular (peroneal) nerve
Tibialis anterior muscle
Extensor digitorum longus muscle
Extensor hallucis longus muscle
Lateral branch of deep fibular (peroneal) nerve to Extensor hallucis brevis and Extensor digitorum brevis muscles
Medial branch of deep fibular (peroneal) nerve

Cutaneous innervation

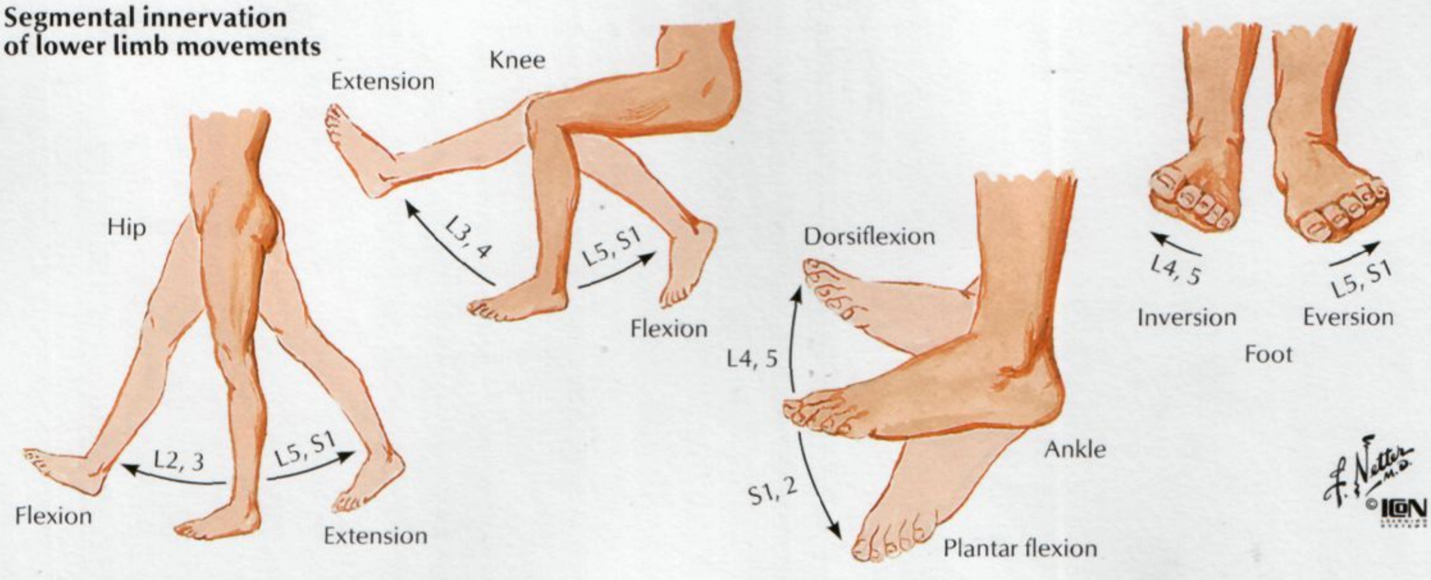

Lateral sural cutaneous nerve
Superficial fibular (peroneal) nerve
Deep fibular (peroneal) nerve
Sural nerve via lateral dorsal cutaneous branch

Dermatomes of Lower Limb

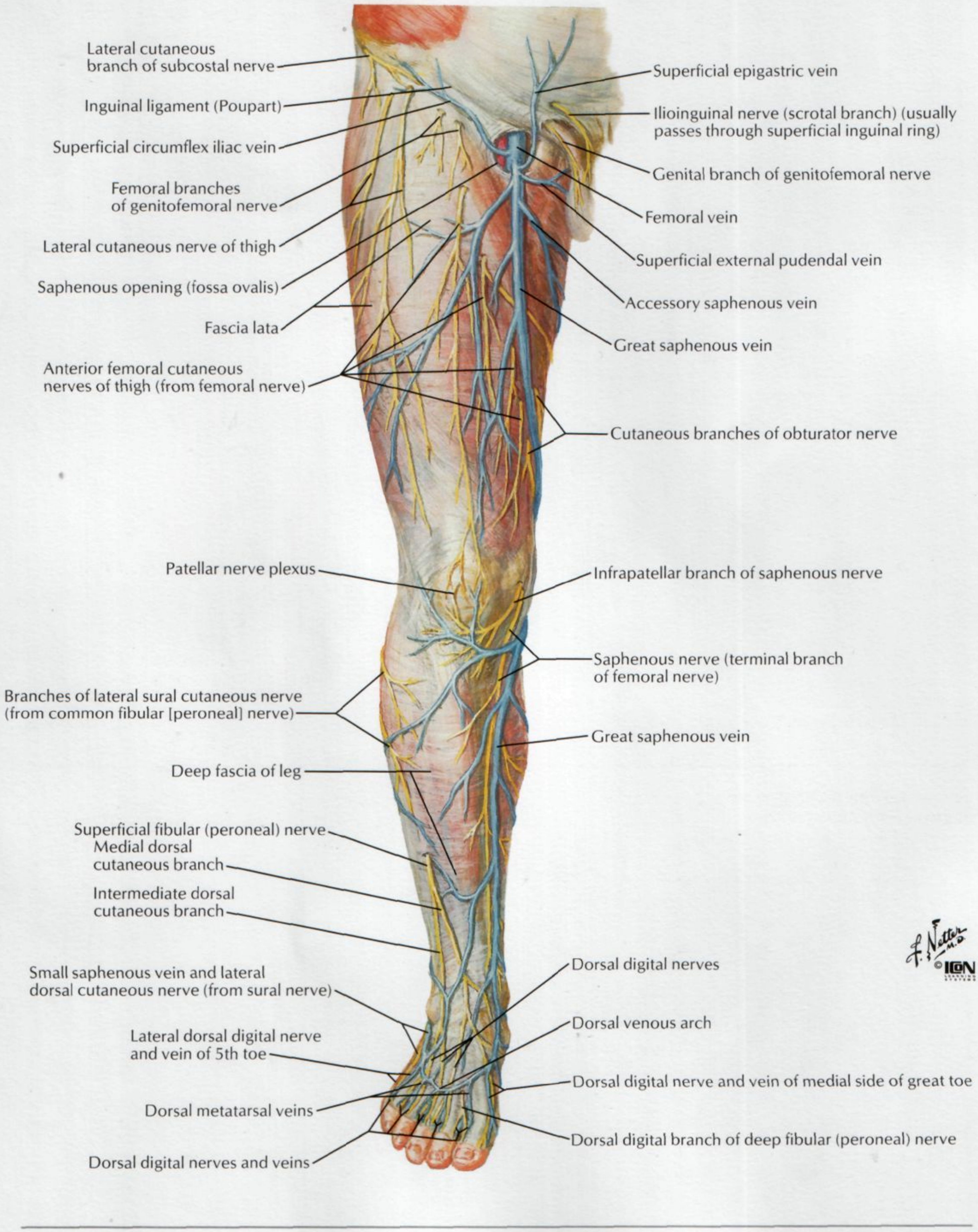
Schematic demarcation of dermatomes (according to Keegan and Garrett) shown as distinct segments. There is actually considerable overlap between any two adjacent dermatomes. An alternative dermatome map is that provided by Foerster (see References).



Segmental innervation of lower limb movements



Superficial Nerves and Veins of Lower Limb: Anterior View


Lateral cutaneous branch of subcostal nerve
Inguinal ligament (Poupart)
Superficial circumflex iliac vein
Femoral branches of genitofemoral nerve
Lateral cutaneous nerve of thigh
Saphenous opening (fossa ovalis)
Fascia lata
Anterior femoral cutaneous nerves of thigh (from femoral nerve)
Superficial epigastric vein
Ilioinguinal nerve (scrotal branch) (usually passes through superficial inguinal ring)
Genital branch of genitofemoral nerve
Femoral vein
Superficial external pudendal vein
Accessory saphenous vein
Great saphenous vein
Cutaneous branches of obturator nerve
Patellar nerve plexus
Infrapatellar branch of saphenous nerve
Saphenous nerve (terminal branch of femoral nerve)
Branches of lateral sural cutaneous nerve (from common fibular [peroneal] nerve)
Great saphenous vein
Deep fascia of leg
Superficial fibular (peroneal) nerve
Medial dorsal cutaneous branch
Intermediate dorsal cutaneous branch
Small saphenous vein and lateral dorsal cutaneous nerve (from sural nerve)
Lateral dorsal digital nerve and vein of 5th toe
Dorsal metatarsal veins
Dorsal digital nerves and veins
Dorsal digital nerves
Dorsal venous arch
Dorsal digital nerve and vein of medial side of great toe
Dorsal digital branch of deep fibular (peroneal) nerve
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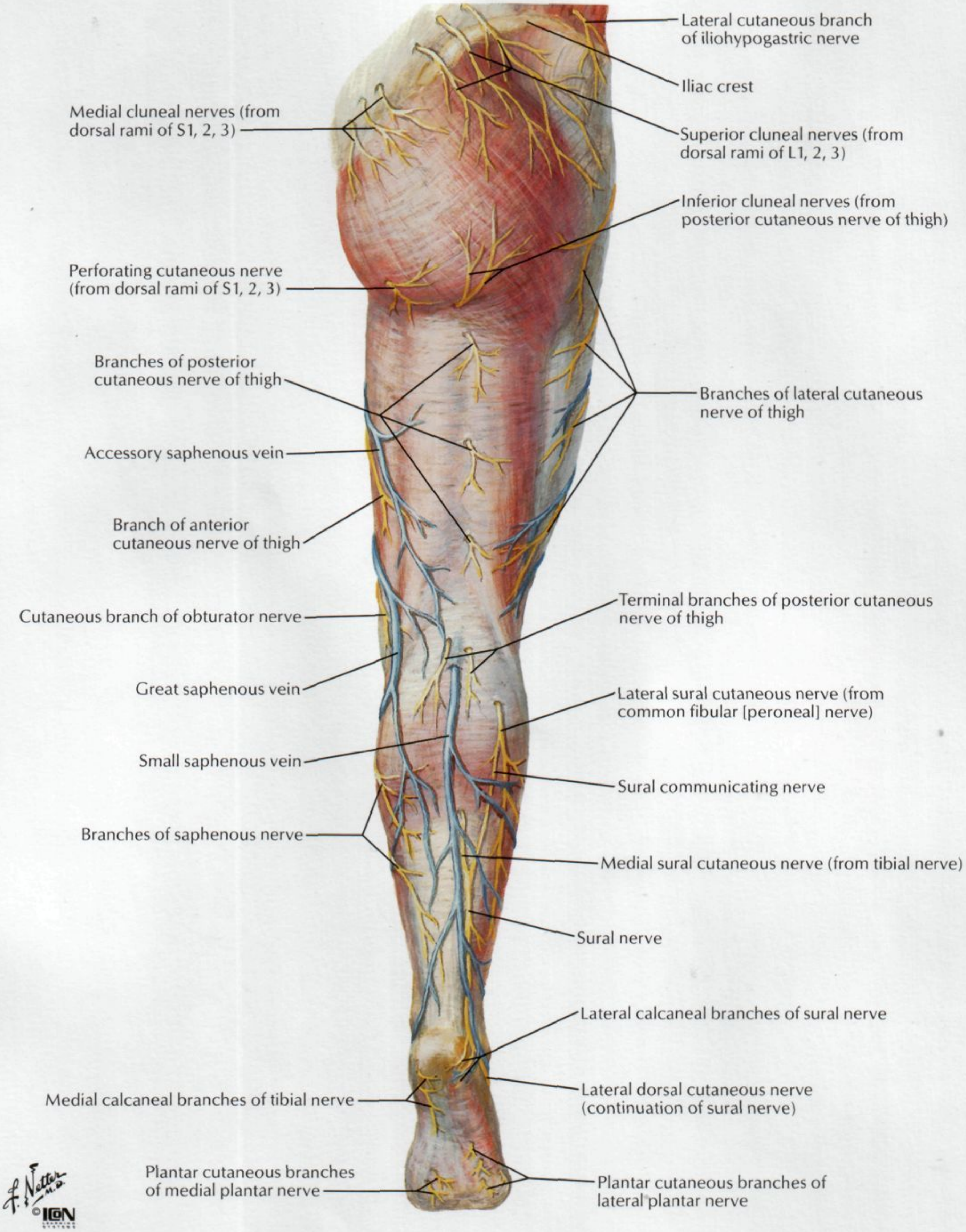
Superficial Nerves and Veins of Lower Limb: Posterior View


Lateral cutaneous branch of iliohypogastric nerve
Iliac crest
Superior cluneal nerves (from dorsal rami of L1, 2, 3)
Medial cluneal nerves (from dorsal rami of S1, 2, 3)
Inferior cluneal nerves (from posterior cutaneous nerve of thigh)
Perforating cutaneous nerve (from dorsal rami of S1, 2, 3)
Branches of posterior cutaneous nerve of thigh
Branches of lateral cutaneous nerve of thigh
Accessory saphenous vein
Branch of anterior cutaneous nerve of thigh
Cutaneous branch of obturator nerve
Terminal branches of posterior cutaneous nerve of thigh
Great saphenous vein
Lateral sural cutaneous nerve (from common fibular [peroneal] nerve)
Small saphenous vein
Sural communicating nerve
Branches of saphenous nerve
Medial sural cutaneous nerve (from tibial nerve)
Sural nerve
Lateral calcaneal branches of sural nerve
Medial calcaneal branches of tibial nerve
Lateral dorsal cutaneous nerve (continuation of sural nerve)
Plantar cutaneous branches of medial plantar nerve
Plantar cutaneous branches of lateral plantar nerve

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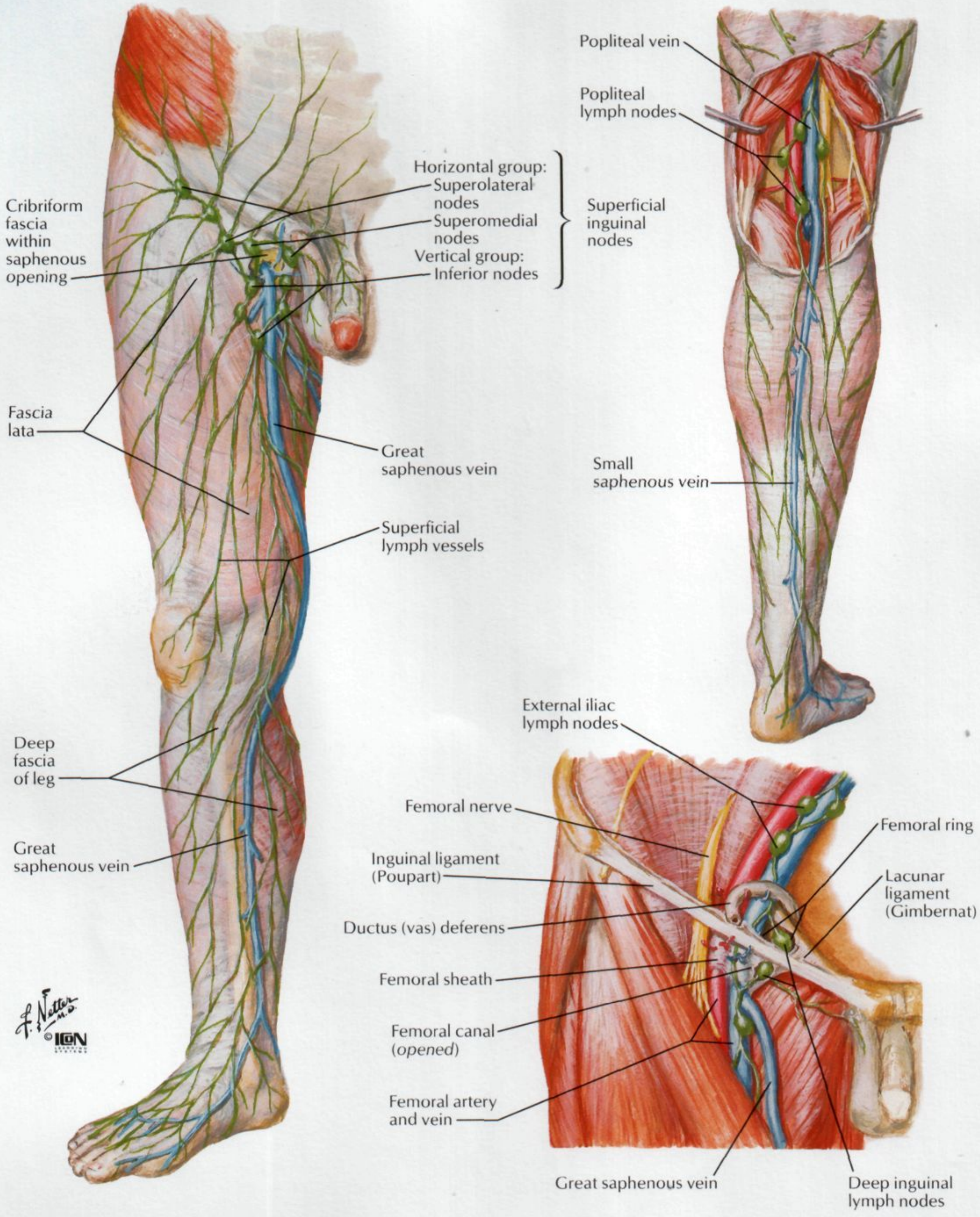
Lymph Vessels and Nodes of Lower Limb

SEE ALSO PLATES 387, 388



Section VIII

CROSS-SECTIONAL ANATOMY

CROSS-SECTION OVERVIEW
Plate 529

529. Key Figure for Cross Sections

THORAX
Plates 530–533

530. Thorax: Brachiocephalic Vessels
531. Thorax: Aortic and Azygos Arches
532. Thorax: Pulmonary Trunk
533. Thorax: Four Chambers of Heart

ABDOMEN
Plates 534–539

534. Abdomen: Esophagogastric Junction
535. Abdomen: Pylorus and Body of Pancreas
536. Abdomen: Origins of Celiac Artery and Portal Vein
537. Abdomen: Renal Hilum and Vessels
538. Abdomen: Ileocecal Junction
539. Abdomen: Sacral Promontory

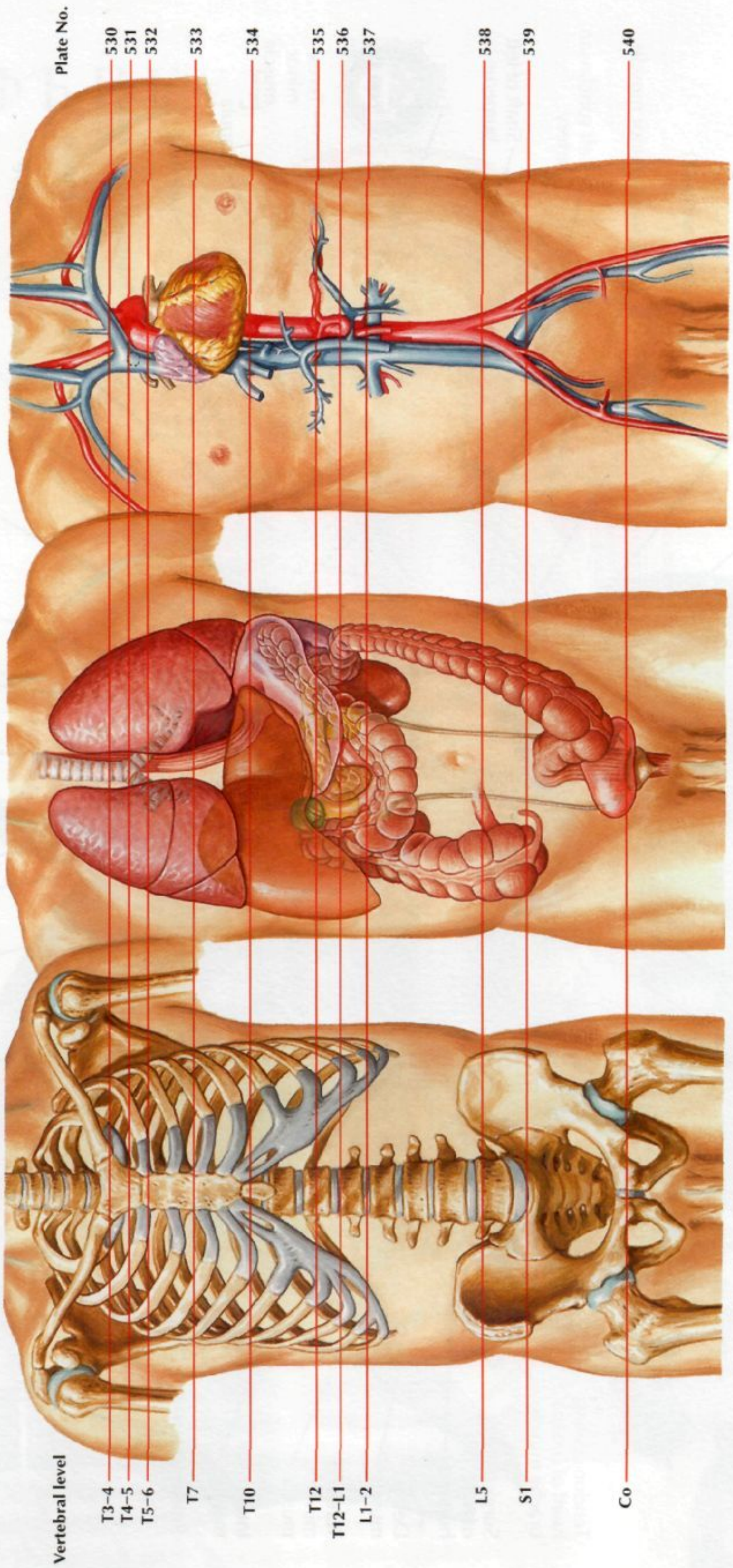
MALE PELVIS
Plate 540

540. Male Pelvis: Bladder-Prostate Junction

THORAX
Plates 541–542

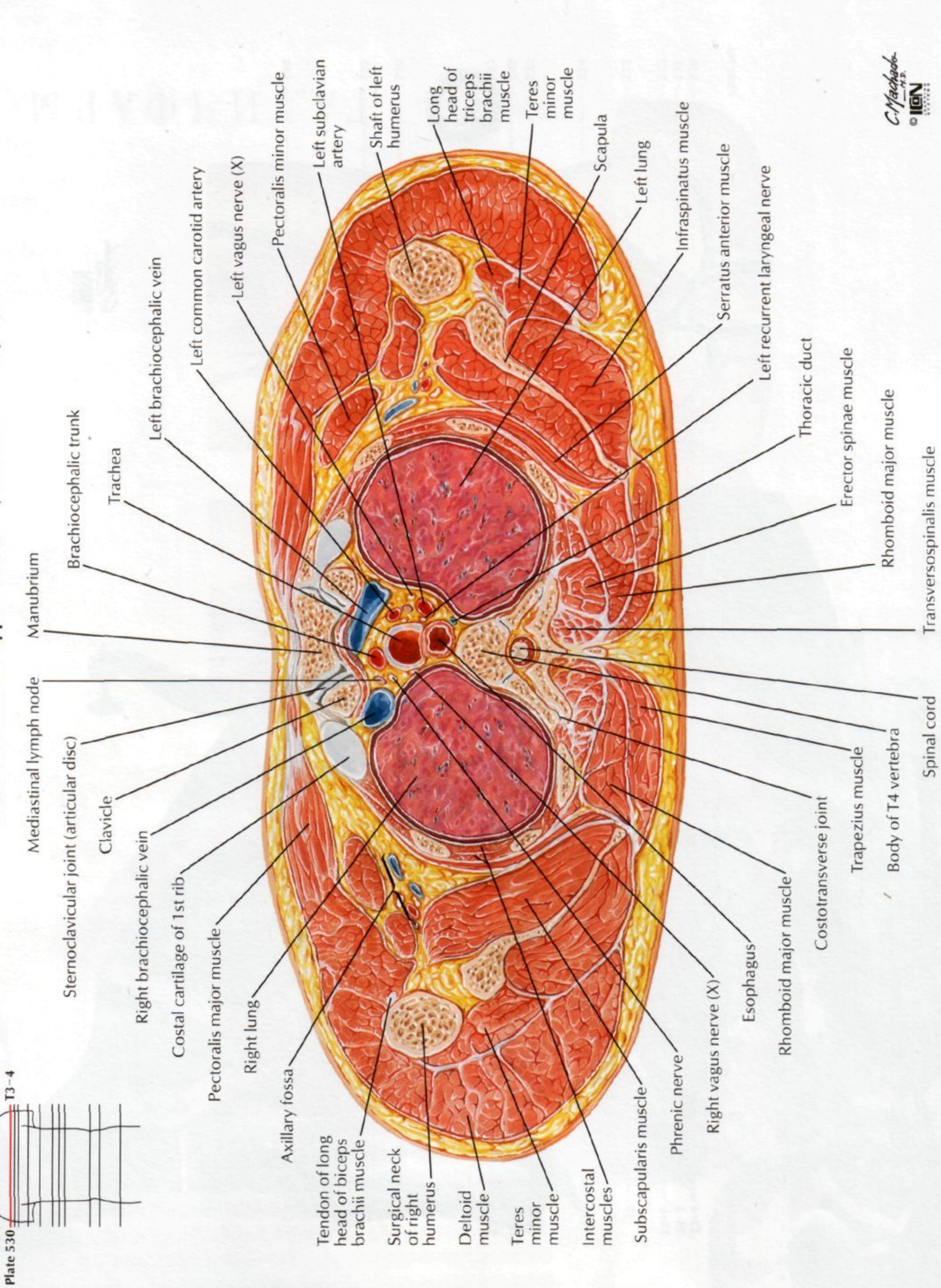
541. Thorax: Heart, Ascending Aorta
542. Thorax: Tracheal Bifurcation, Left Atrium

Key Figure for Cross Sections

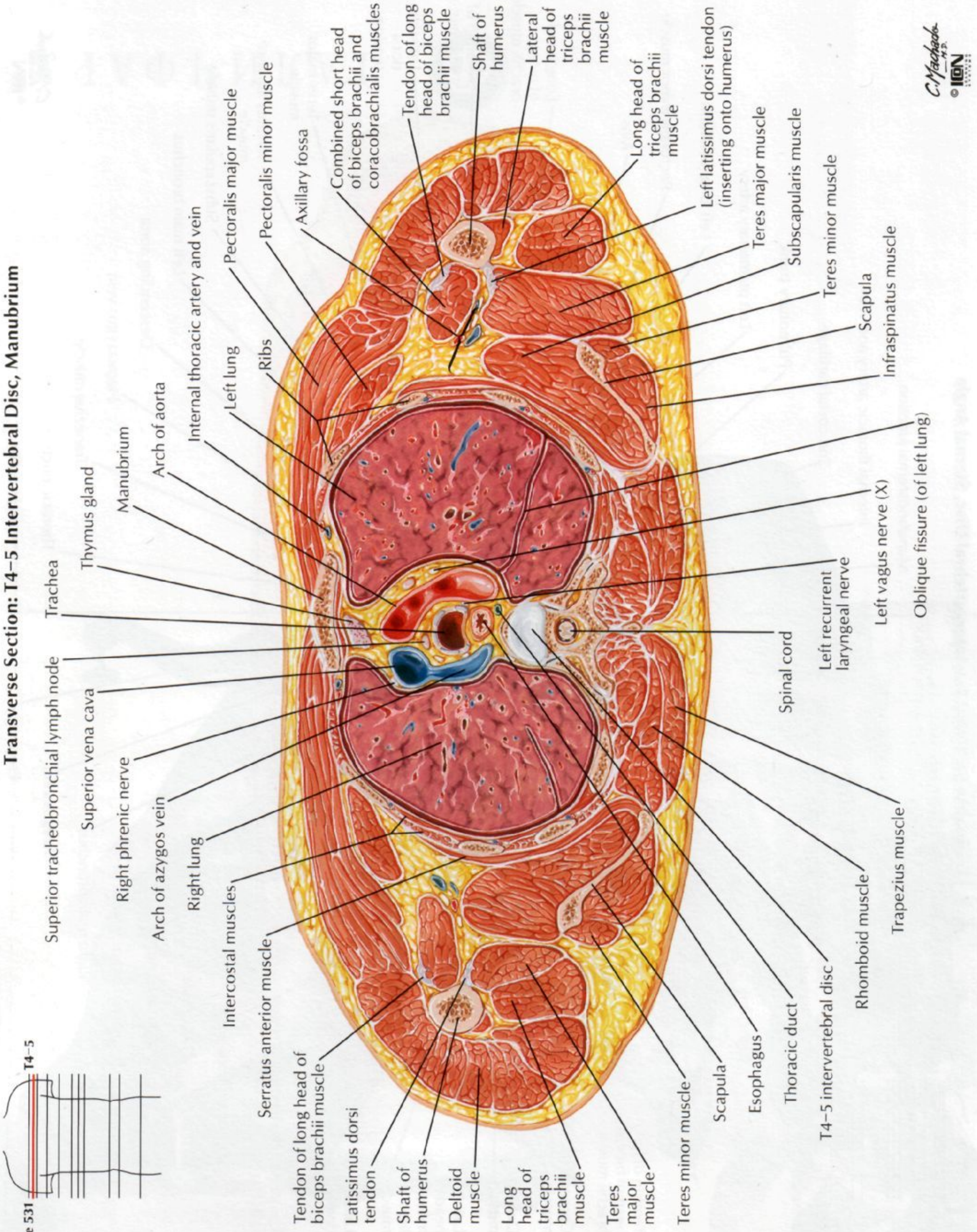


Thorax: Brachiocephalic Vessels

Transverse Section: Upper Level of T4, Sternoclavicular Joint

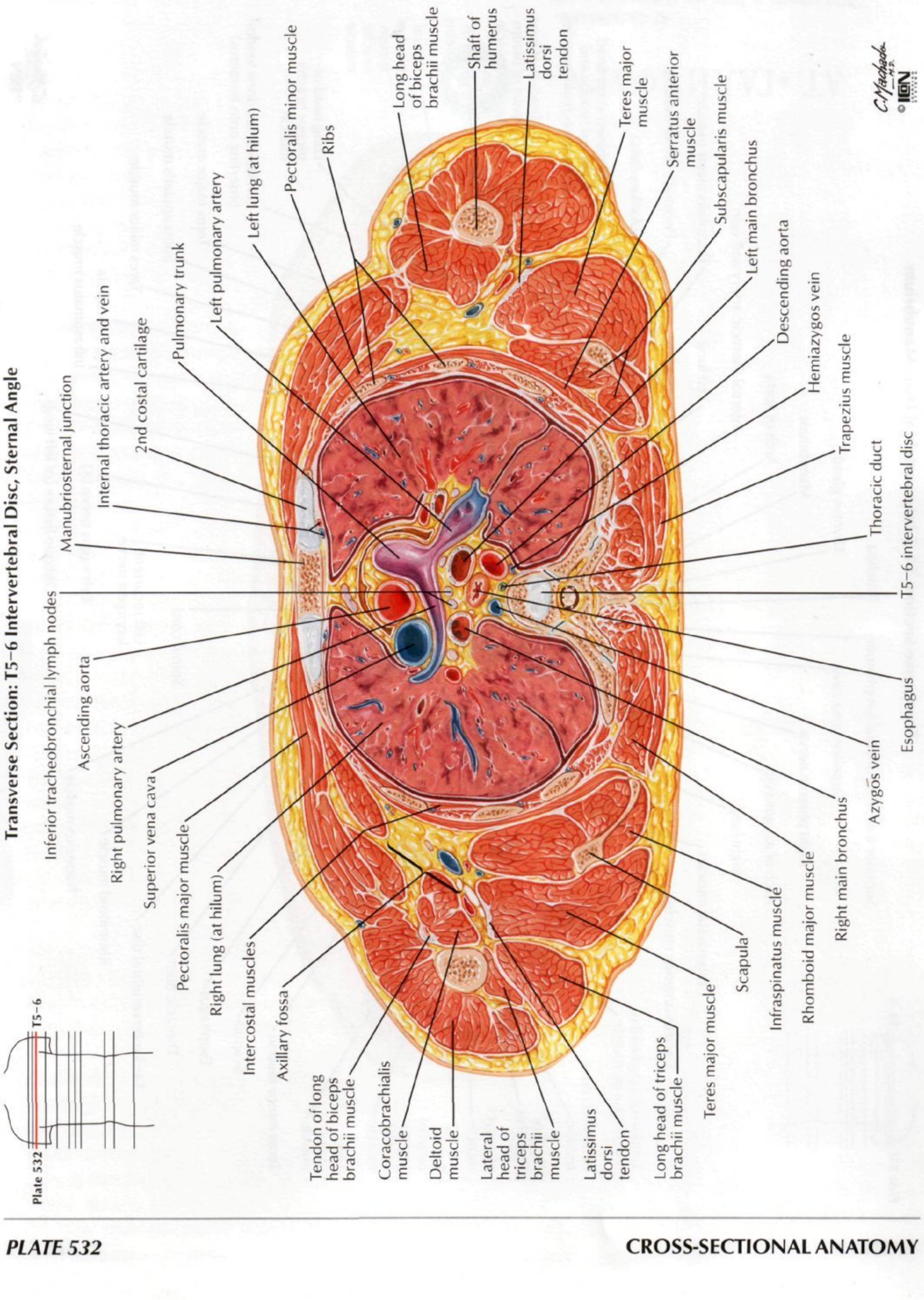


Transverse Section: T4–5 Intervertebral Disc, Manubrium



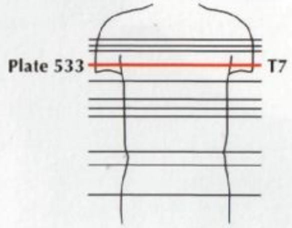
Thorax: Pulmonary Trunk

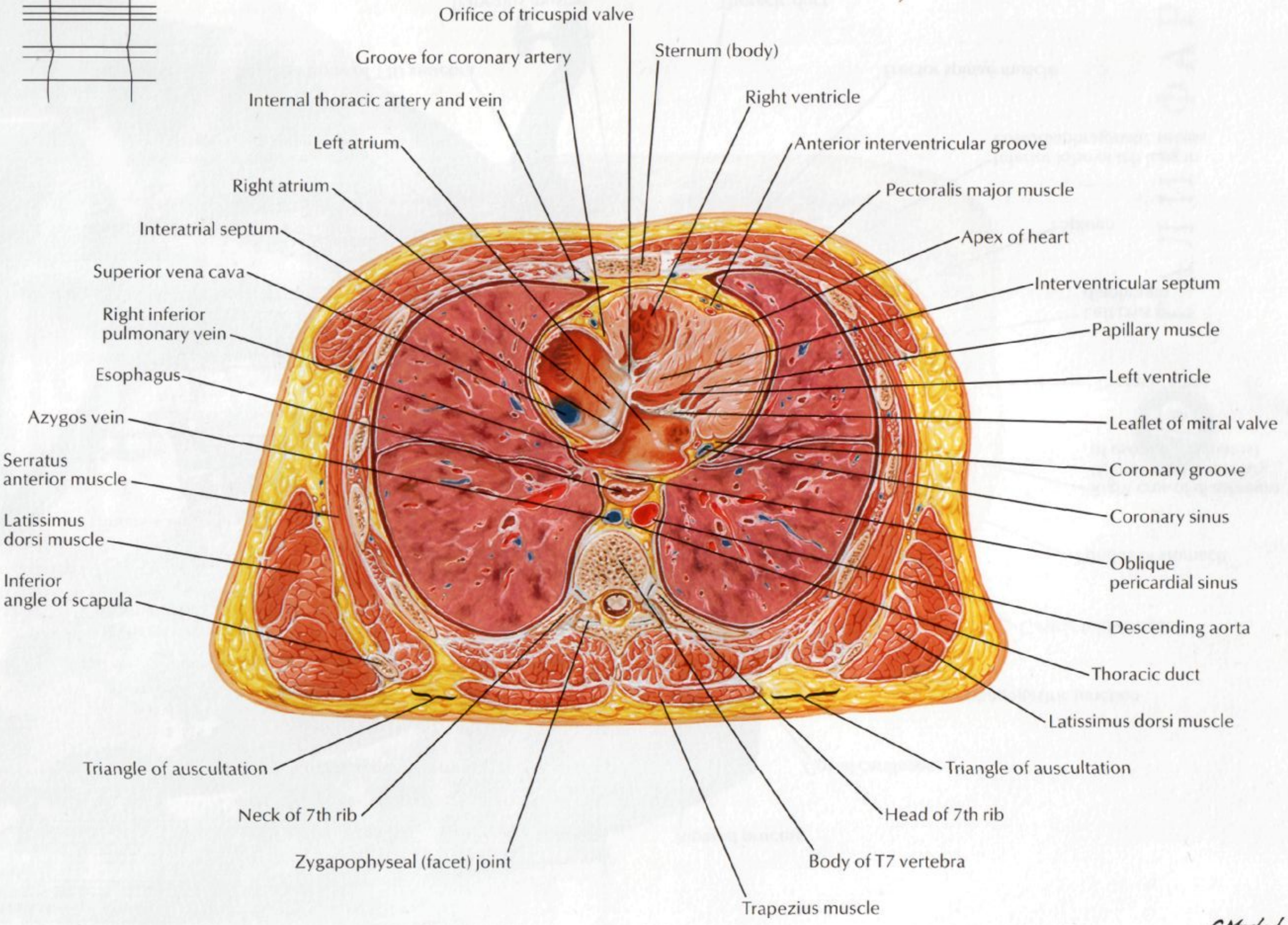
Transverse Section: T5–6 Intervertebral Disc, Sternal Angle



Thorax: Four Chambers of Heart

Transverse Section: Level of T7, 3rd Interchondral Space





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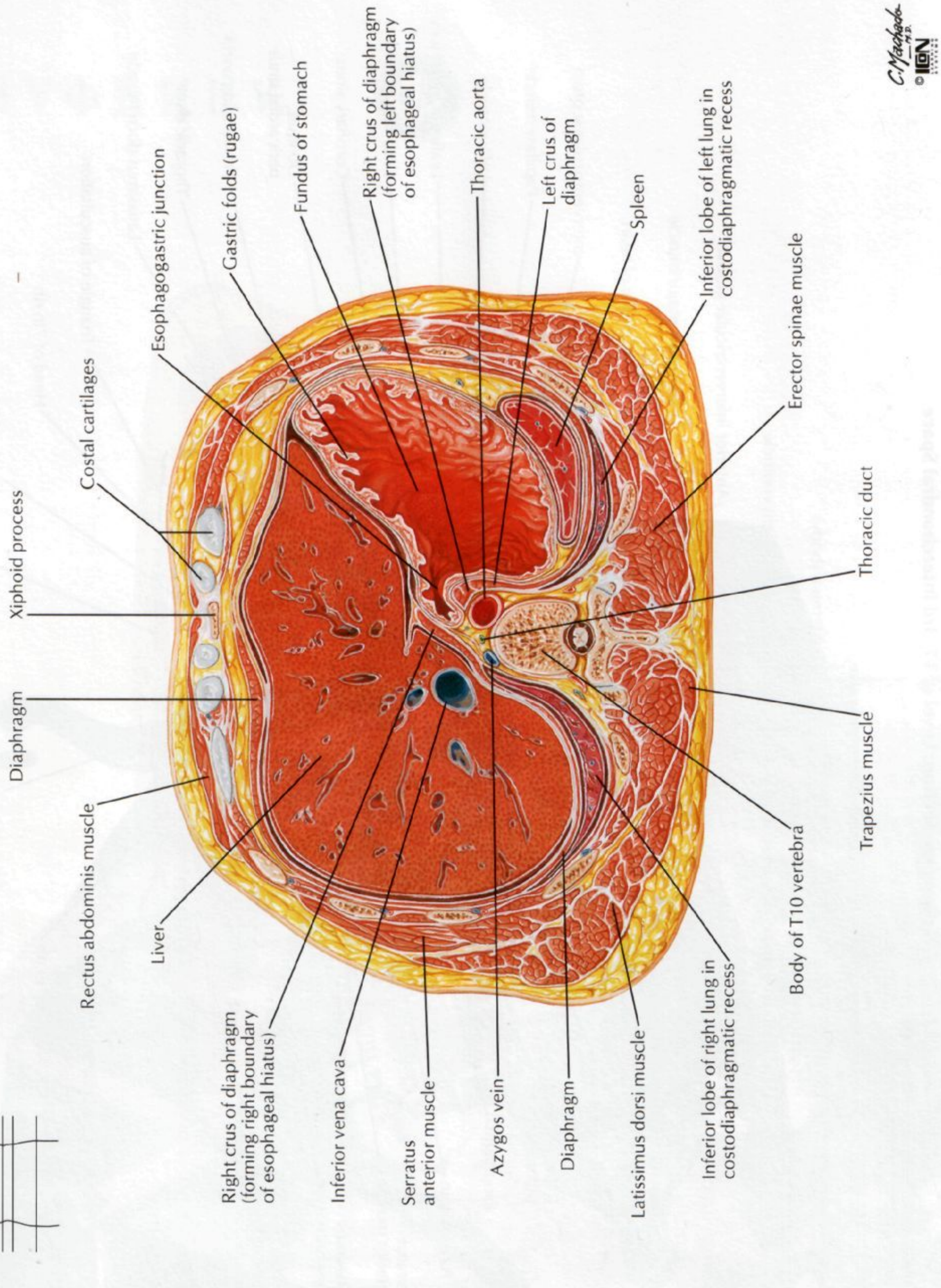
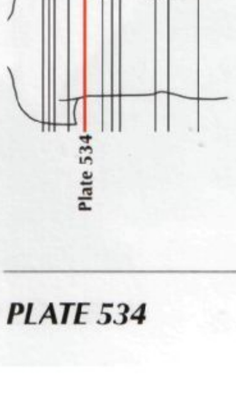
Abdomen: Esophagogastric Junction

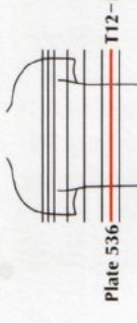
Transverse Section: Level of T10, Esophagogastric Junction

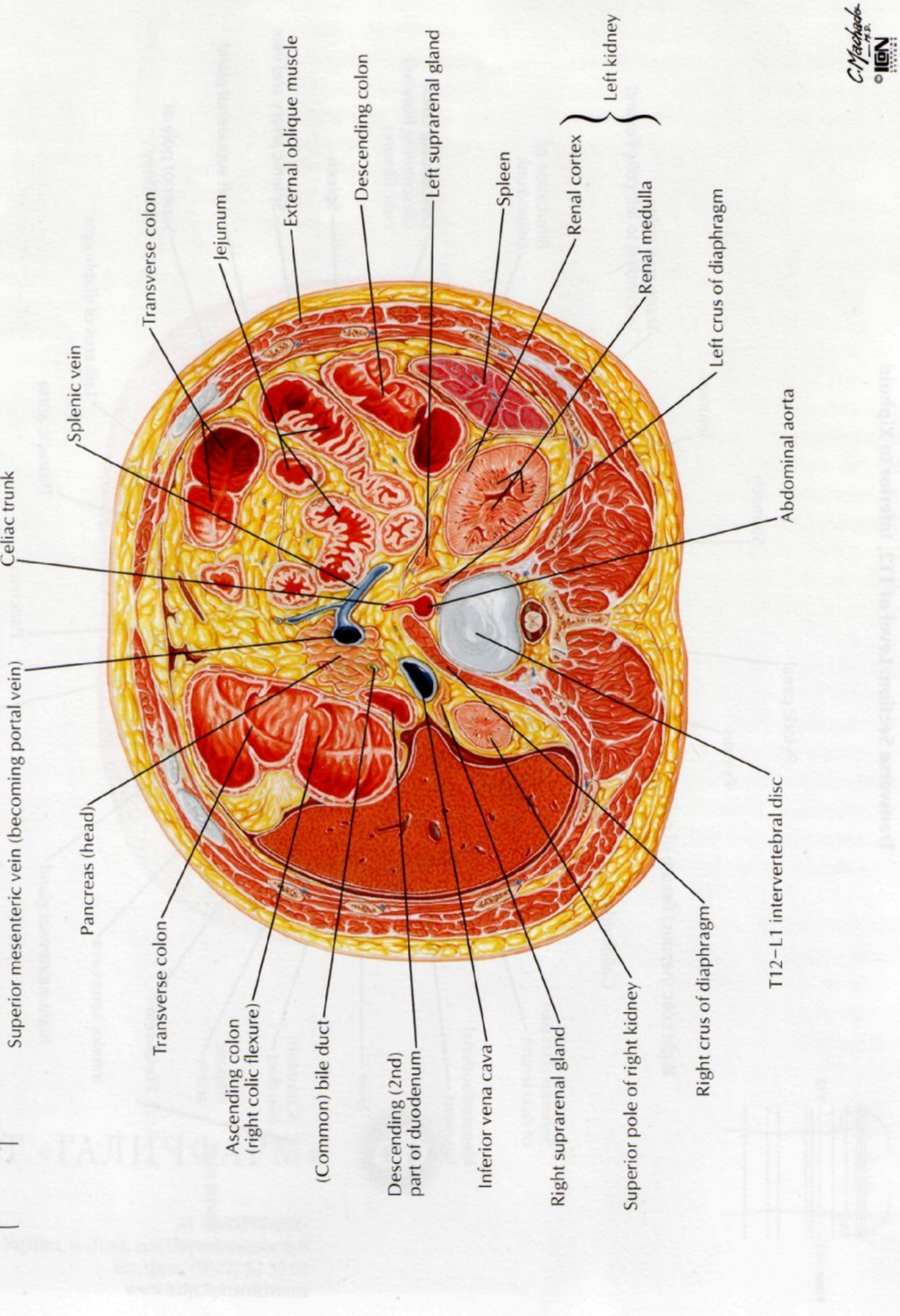




Abdomen: Origins of Celiac Artery and Portal Vein

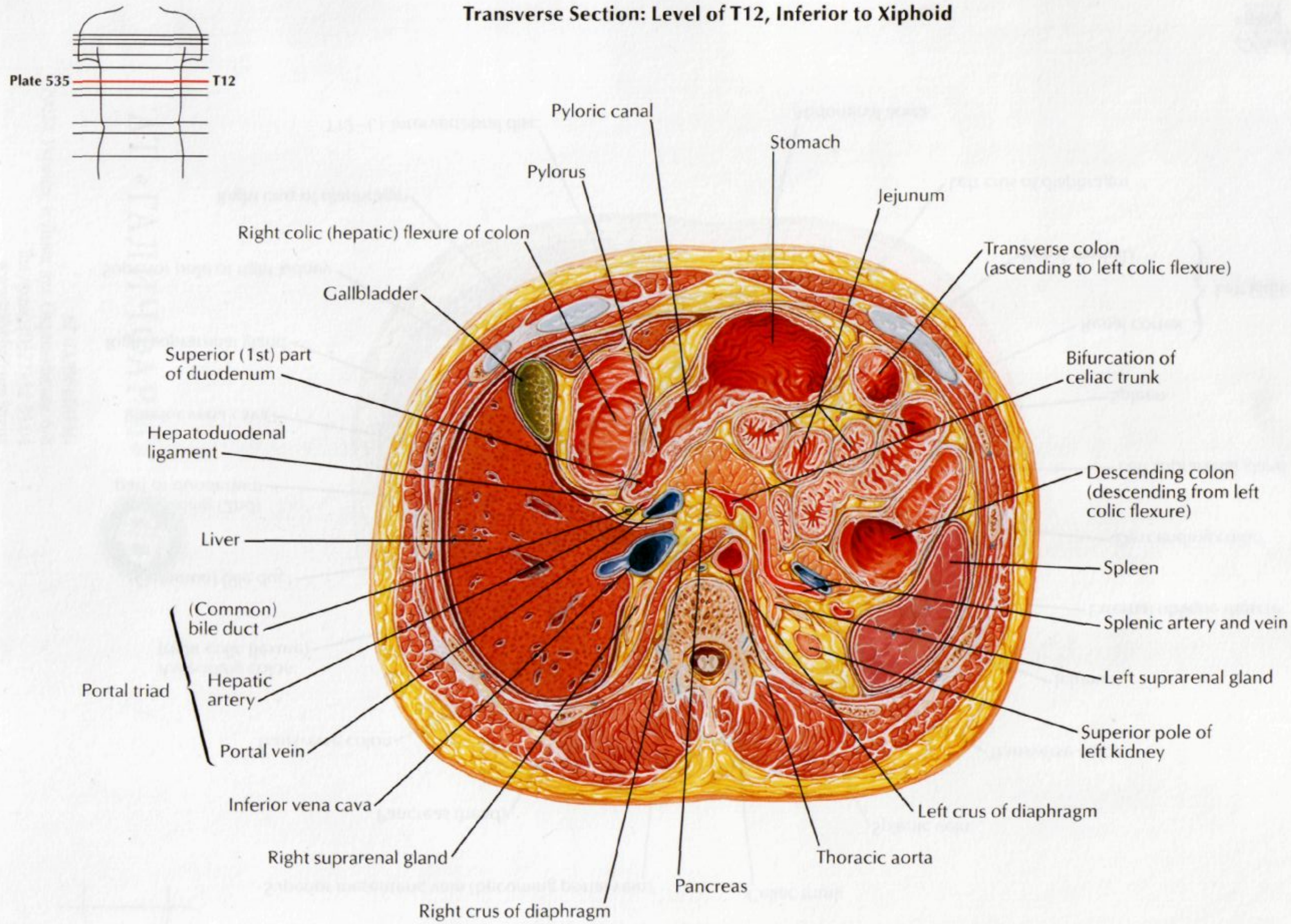
Transverse Section: Level of T12–L1 Intervertebral Disc





Abdomen: Pylorus and Body of Pancreas

Transverse Section: Level of T12, Inferior to Xiphoid



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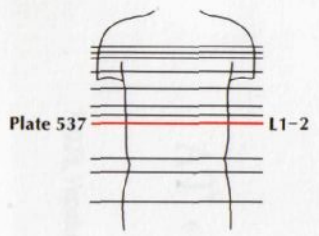
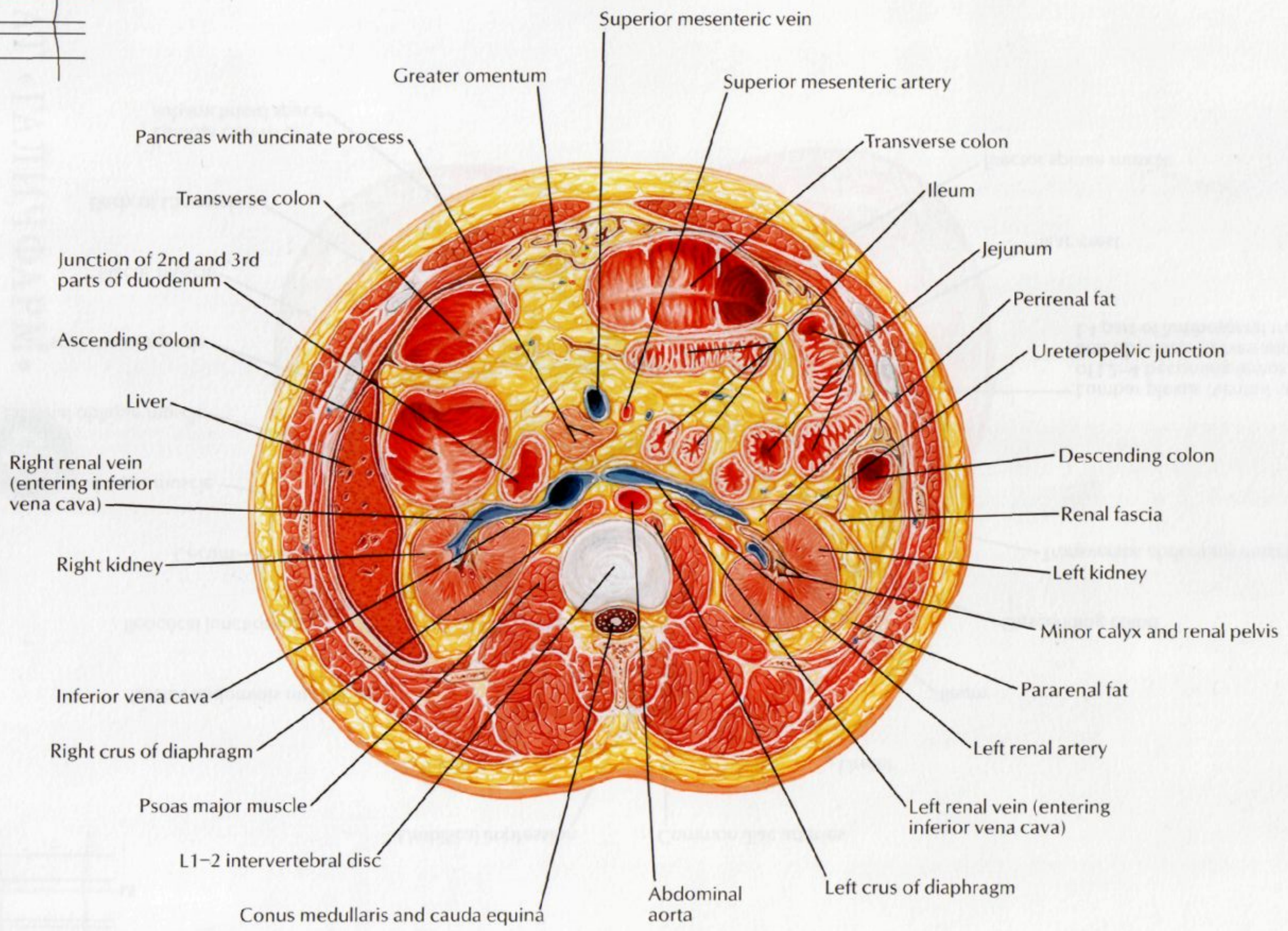
Abdomen: Renal Hilum and Vessels

Transverse Section: Level of L1–2 Intervertebral Disc





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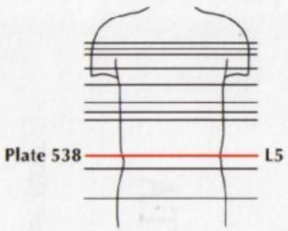
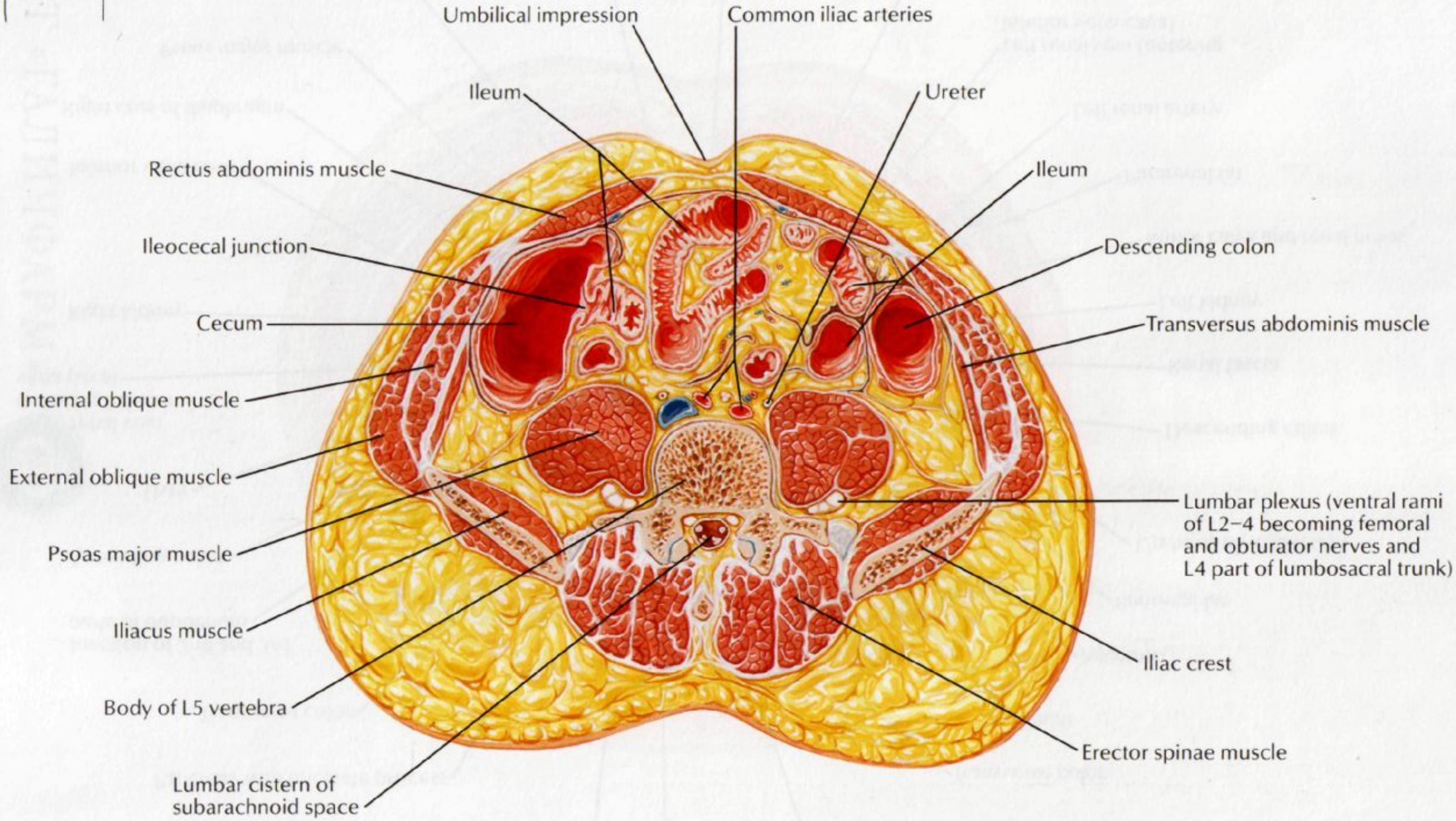
Transverse Section: Level of L5, Near Transtubercular Plane





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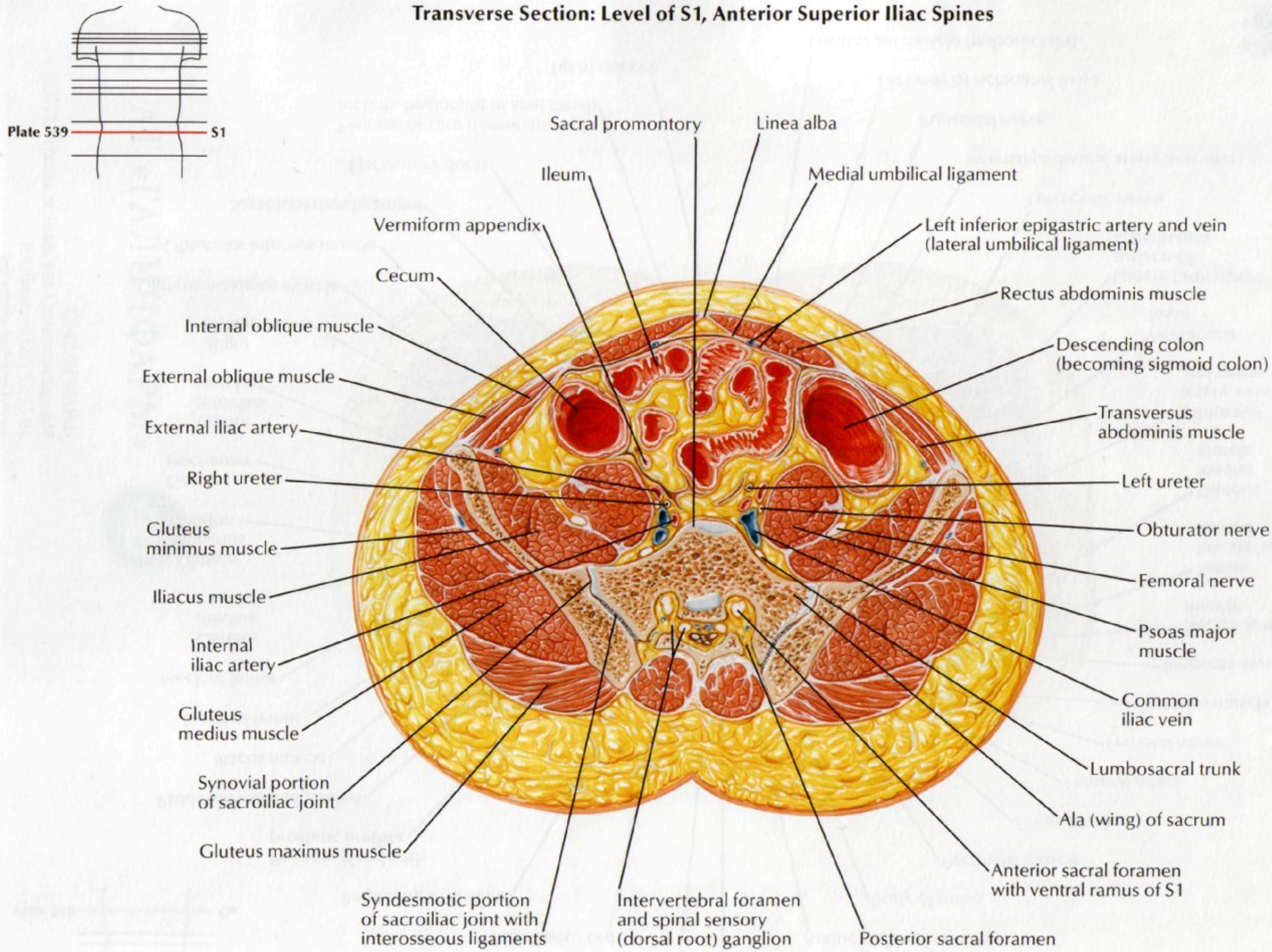
Transverse Section: Level of S1, Anterior Superior Iliac Spines



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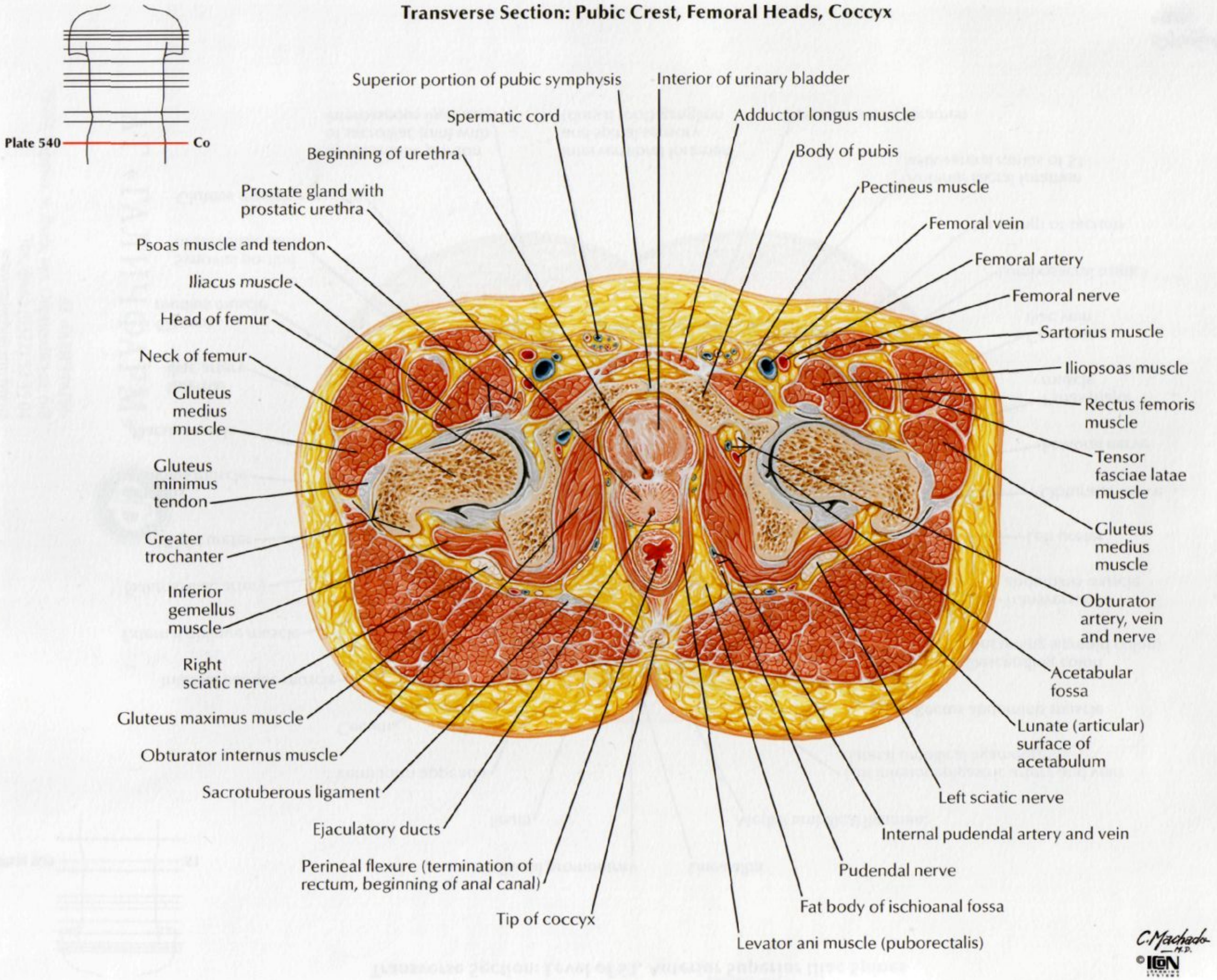
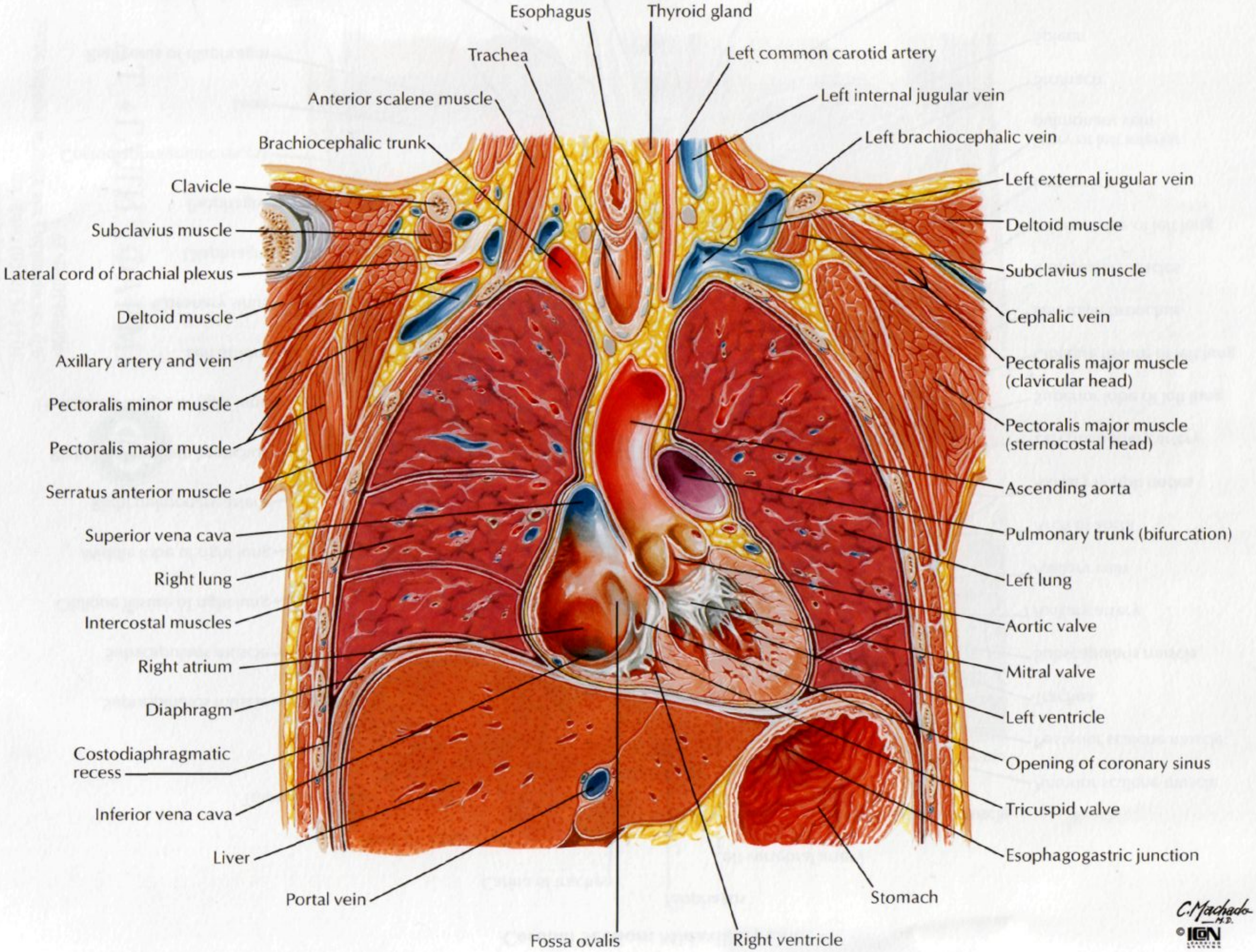
Male Pelvis: Bladder-Prostate Junction

Transverse Section: Pubic Crest, Femoral Heads, Coccyx

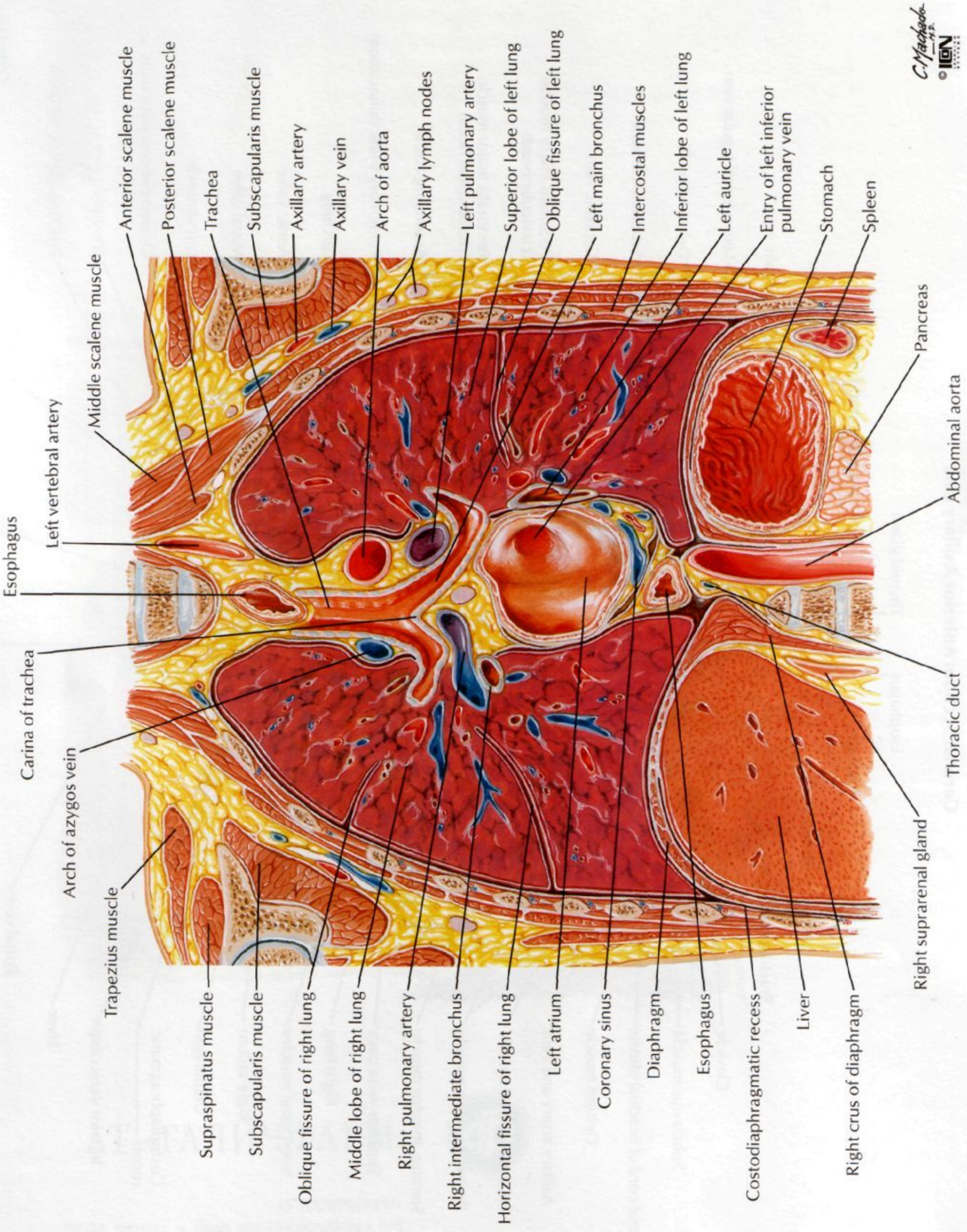


Coronal Section: Anterior Axillary Line



Thorax: Tracheal Bifurcation, Left Atrium

Coronal Section: Midaxillary Line



Frank H. Netter, M.D.

Frank H. Netter was born in 1906 in New York City. He studied art at the Art Student's League and the National Academy of Design before entering medical school at New York University, where he received his M.D. degree in 1931. During his student years, Dr. Netter's notebook sketches attracted the attention of the medical faculty and other physicians, allowing him to augment his income by illustrating articles and textbooks. He continued illustrating as a sideline after establishing a surgical practice in 1933, but he ultimately opted to give up his practice in favor of a full-time commitment to art. After service in the United States Army during World War II, Dr. Netter began his long collaboration with the CIBA Pharmaceutical Company (now Novartis Pharmaceuticals). This 45-year partnership resulted in the production of the extraordinary collection of medical art so familiar to physicians and other medical professionals worldwide.

Icon Learning Systems acquired the Netter Collection in July 2000 and continues to update Dr. Netter's original paintings and to add newly commissioned paintings by artists trained in the style of Dr. Netter.

Dr. Netter's works are among the finest examples of the use of illustration in the teaching of medical concepts. The 13-book Netter Collection of Medical Illustrations, *which includes the greater part of the more than 20,000 paintings created by Dr. Netter, became and remains one of the most famous medical works ever published.* The Netter Atlas of Human Anatomy, *first published in 1989, presents the anatomical paintings from the Netter Collection. Now translated into 11 languages, it is the anatomy atlas of choice among medical and health professions students the world over.*

The Netter illustrations are appreciated not only for their aesthetic qualities, but more importantly, for their intellectual content. As Dr. Netter wrote in 1949, ". . . clarification of a subject is the aim and goal of illustration. No matter how beautifully painted, how delicately and subtly rendered a subject may be, it is of little value as a medical illustration *if it does not serve to make clear some medical point." Dr. Netter's planning, conception, point of view, and approach are what inform his paintings and what makes them so intellectually valuable.*

Frank H. Netter, M.D., physician and artist, died in 1991.

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